IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

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| ACQIS LLC | * |
| | * March 18, 2024 |
| VS. | * |
| | * CIVIL ACTION NO. 6:20-CV-966 |
| ASUSTEK COMPUTER, INC. | * |
| ASUS GLOBAL PTE. LTD. | * |

BEFORE THE HONORABLE ALAN D ALBRIGHT
JURY TRIAL PROCEEDINGS
Volume 1 of 5

APPEARANCES:

For the Plaintiff:
Case L. Collard, Esq.
Gregory S. Tamkin, Esq.
Dorsey & Whitney LLP
1400 Wewatta Street, Suite 400
Denver, CO 80202

Madeline Hepler, Esq.
Dorsey & Whitney LLP
701 5th Ave, Suite 6100
Seattle, WA 98104

Elliot J. Hales, Esq.
Dorsey & Whitney LLP
111 S. Main Street, Suite 2100
Salt Lake City, UT 84111

Paige Arnette Amstutz, Esq.
Scott, Douglass & McConnico, LLP
303 Colorado Street, Suite 2400
Austin, TX 78701

For the Defendants:
Eric A Buresh, Esq.
Mark C. Lang, Esq.
Michelle L. Marriott, Esq.
Erise IP, PA
7015 College Boulevard
Overland Park, KS 66211

James Travis Underwood, Esq.
Gillam & Smith
102 N. College, Suite 800
Tyler, TX 75702

Court Reporter: Kristie M. Davis, CRR, RMR
PO Box 20994
Waco, Texas 76702-0994
(254) 340-6114

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08:30
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08:50 (Hearing begins.)
08:50 THE BAILIFF: All rise.
08:50 THE COURT: Good morning, everyone. You may be seated.
08:50 I understand we have a couple of issues to take up. Happy to do it.
08:50 MR. COLLARD: Thank you, Your Honor. Case Collard for ACQIS. And we sent a joint e-mail in to Mr. Shultz.
08:50 The first issue is one I think -- I hope we can dispose of pretty quickly. And that would be, there is disagreement about the claim construction document that will go in the juror notebook and that also we'll use in our slides.
08:51 I don't think -- and I'm certainly happy to let ASUSTeK and ASGL speak for themselves. But I think the issue is they just want to preserve their objection to your construction, but they recognize that the construction applies in this case.
08:51 And so I'll let Ms. Marriott speak on that.
08:51 MS. MARRIOTT: Your Honor, may I approach the...
08:51 THE COURT: Sure.
08:51 MS. MARRIOTT: Your Honor, the question

here is the "PCI bus transaction" term that's been construed by the Court.

The Court in construing that term said: I'm going to adopt the Federal Circuit's construction of a transaction in accordance with the industry standard PCI local bus specification for communication with interconnected peripheral component.

That's the construction that defendants believe should go in the jury notebook. That is the Federal Circuit's construction. And we believe that that is the construction that the Court adopted.

The issue comes with the next sentence from the claim construction transcript where Your Honor said: But I'm also putting on the record, and we'll get an order out as quickly as possible, we agree with plaintiff that "in accordance with" includes backwards compatibility and that adding backwards compatibility does not expand the scope.

So the question is whether that last part of Your Honor's statement is part of the construction or not. And defendants' position is that's not in the Federal Circuit's construction and should not be submitted to the jury.

THE COURT: Could I see what it is that plaintiff wants to submit?

MS. MARRIOTT: Absolutely, Your Honor. Can I pass this up? This is from our joint jury instruction, so it has -- defendants blue and ACQIS is red.

THE COURT: And I'll hear from the plaintiff.

MR. COLLARD: Your Honor, you -- I think Ms. Marriott admits and the defendants admit the key point, which is your construction said that in accordance with includes backwards compatibility. That was an additional part of your construction.

You've construed the same term in the same patents and issued an order in the Sony case in which the -- this same counsel, that also says backwards compatible.

There's no dispute that backwards compatible is a part of the construction the jury should be instructed on. The idea to keep it out now would really just be going back and changing your construction.

THE COURT: Okay. So for the record, I'm going to go with what the plaintiff is suggesting.

What is the next issue?

MR. COLLARD: Thank you, Your Honor.

The next issue is an objection to -- the

content is really the same on these issues, Your Honor. It's our discussion, our use, and our admission of licenses that the defendants claim are not comparable.

The issue is that ACQIS has about 21 licenses that to -- that include the patents-in-suit. The way the evidence is likely to come in is that I'm going to talk with Dr. Chu, who's the CEO of ACQIS, and talk about his overall approach to licensing and negotiation, what kind of -- you know, royalty versus lump sum, whether there's additional compensation considered, and how that affects the amounts, all of those issues.

Our expert, that's exactly the sort of thing he talks about in his expert report, what is ACQIS' approach to negotiation. He then says: I looked at all -- and analyzed all 21 of those licenses. And here are the, I think, 13 or so that I found most comparable for purposes of calculating my royalty rate.

What defendants want is that the -- they want to take the fact or the moment where the expert says, well, I found these are comparable for purposes of calculating my royalty rate, and then say, now those other licenses are excluded from the case as if they didn't happen.

The plaintiff and CEO who signed those

08:56 licenses --

08:56 THE COURT: Are they in your expert's report?

08:56 MR. COLLARD: Yes.

08:56 THE COURT: I'm not sure what the objection is.

08:56 MS. MARRIOTT: Your Honor, the licenses that -- so the context is there's a summary chart that lists a lot of licenses with a lot of amounts.

08:57 All of the licenses that we're objecting to are ones that our expert has found to be noncomparable and the plaintiff's expert has found to be noncomparable.

08:57 So the issue here is, one, they're not relevant to any issue in this case. They're not being used by either expert. And, two, it's prejudicial.

08:57 THE COURT: Well, it's not prejudicial. But if -- your expert's welcome to explain that, and this is just argument.

08:57 I'm going to overrule the objection.

08:57 What do we have next?

08:57 MR. COLLARD: Your Honor, I think to be clear on the chart is to --

08:57 THE COURT: Now, if the plaintiff says something in opening that's inconsistent with what the

08:57 evidence shows, you can point that out as well.

08:57 I mean, whatever -- just so you know, 08:57 this past week...

08:57 MR. COLLARD: Your Honor --

08:57 THE COURT: I cut something out last week 08:57 in a trial in a motion in limine, and the person who'd 08:57 asked me to keep it out brought it up during opening 08:58 and then was unaware that opening counted in terms of 08:58 what's said to the jury and that it -- you could open 08:58 the door during openings.

08:58 So that -- just in case you're wondering, 08:58 what you say in opening, while it's only argument, the 08:58 other side still gets to use it. So...

08:58 MR. COLLARD: Understood, Your Honor. I 08:58 appreciate the reminder.

08:58 THE COURT: I'm having such a hard time 08:58 with your counsel sitting at the plaintiff's table that 08:58 I may be confused occasionally seeing her over at 08:58 counsel -- on the plaintiff's side. It's just -- I'm 08:58 having a little bit of PTSD over that, but I guess 08:58 I'll...

08:58 And not that -- you're -- the defense 08:58 local counsel isn't usually on the other side as well. 08:58 So maybe -- I'll just have to do my best to remember 08:58 which sides they're representing when they're up here.

08:58 MR. COLLARD: We don't have a little sign, I guess.

08:58 Your Honor, I think it is fair to take up the tail end of this dispute, then, which is actually over this Rule 1006 summary exhibit --

08:59 THE COURT: Okay.

08:59 MR. COLLARD: -- which was objected to by plaintiffs.

08:59 I don't know if you have any -- in light of this ruling, do you have remaining objections to the summary exhibit?

08:59 MS. MARRIOTT: Just a few.

08:59 Your Honor, on the summary, so 1006 allows for a summary of the evidence. This has a few issues here.

08:59 One is it has a column for effective royalty rate, which is really just calculations their expert is doing, not necessarily terms of the licenses themselves.

08:59 So we would ask that that be not submitted to the jury because that's really -- an effective royalty rate is by definition expert calculations.

08:59 THE COURT: That's overruled.

08:59 What else do you have?

MS. MARRIOTT: The last column here is additional compensation to ACQIS, and it has things like 5 percent of future sales, stop making infringing product. I don't know that that's necessarily compensation to ACQIS, so I would just say additional terms.

THE COURT: That's overruled.

Anything else?

MS. MARRIOTT: Thank you, Your Honor. Nothing else.

THE COURT: Yes, sir.

MR. COLLARD: The last issue, Your Honor, is on Exhibit P-50. It's the May 15, 2018 letter to ASUS from ACQIS.

We discussed this at the motion in limine hearing. They have asked for additional redactions to that letter that refer to a prior litigation against IBM in the Eastern District of Texas.

In short, our position is we asked ASUS if they would -- they would agree that the letter is adequate for purposes of notice, and then they can argue about whether they received it or not, notice of infringement.

They won't agree to that. And so in light of that, we really need to have the full

discussion. Because the way -- Dr. Chu wrote a letter that they have characterized as essentially too soft to say it doesn't really allege infringement.

But having a paragraph saying, I'm -- you know, essentially, I'm so serious about this that I litigated through trial with another defendant on other of my patents is certainly relevant to the strength of the notice letter.

THE COURT: A response?

MR. UNDERWOOD: Thank you, Your Honor.

And I've got a copy of the letter if that would be helpful for the Court.

THE COURT: Sure.

MR. UNDERWOOD: Travis Underwood on behalf of the defendants.

So as Mr. Collard pointed out, there's actually three separate sections of this letter that we're asking to be redacted. The first is the second to last paragraph, and I put some annotations on the exhibit so the Court can follow.

This is the IBM litigation in the Eastern District of Texas. It's different patents. It's different products.

THE COURT: I'm going to exclude that paragraph.

09:02 MR. UNDERWOOD: Thank you, Your Honor.

09:02 The next paragraph we're asking to be redacted is the last paragraph.

09:02 THE COURT: Well, let me start over. I'm excluding it for now. I'm going to listen to the testimony. If the plaintiff at some point wants to argue based on -- I don't know how you're going to cross the -- their witness. I'll see how you cross them to determine.

09:02 Right now I don't think it's necessary to have the fact that they were successful against IBM in, but I'll hear what -- how you cross their witnesses to determine whether or not that becomes admissible.

09:02 MR. UNDERWOOD: Thank you, Your Honor. That's all we're asking for.

09:02 And then the -- with respect to that paragraph, the last paragraph addresses a bunch of IPRs. Under the Court's standard motion in limine, we don't think IPR practice should come into the case. It's a sideshow.

09:03 And I'll also point out for the record the IPRs that are referenced in this paragraph, they also are on different patents, Your Honor.

09:03 THE COURT: Okay. I'm going to keep that out.

09:03 MR. UNDERWOOD: And then finally, if we turn to the last page, Your Honor, on the very top paragraph, the final line says, and I quote: HP had invested in our company and is a shareholder.

09:03 And we think, Your Honor, what the plaintiffs are intending to do is to use this to sort of bolster their technology and their credibility. The problem with that, Your Honor, is that one month ago --

09:03 MR. COLLARD: Your Honor, we can agree to redact that line if we're redacting the others.

09:03 THE COURT: Okay.

09:03 MR. UNDERWOOD: Thank you, Your Honor.

09:03 THE COURT: Anything else we need to take up?

09:03 MR. UNDERWOOD: Not from defendants, Your Honor.

09:03 MR. COLLARD: Your Honor -- sorry. Maybe you have something else.

09:03 MR. UNDERWOOD: Your Honor, may I ask Mr. Collard for a clarification on something?

09:03 (Conference between counsel.)

09:04 MR. UNDERWOOD: Your Honor, may I approach with the exhibit at issue? And I apologize. There is a related issue that I was not perceiving.

09:04 THE COURT: Okay.

MR. UNDERWOOD: So on this exhibit, Your Honor, the Court just heard argument about, you know, whether or not experts discuss comparability, things of that nature, but there are three licensees and licenses listed on this exhibit.

For the record, they're the HP license, the Oracle license, and the IBM license that are problematic and have their own baggage for other reasons, and they are all structured similarly.

As we were just talking about in the letter, the plaintiff was telling the world that HP had invested in the company. And that's the way that these were structured. They were structured as investments rather than licenses.

And the issue, Your Honor, is that one month ago, the United States Tax Court issued a decision. And in this decision, these three arrangements were at issue: HP, Oracle, and IBM.

And what that decision did is it upheld income tax penalties. I'm not going to go through the whole thing because it's lengthy, but this is in sum what the United States Tax Court had to say about these agreements: The transaction before us lacks both business purpose and economic substance and is a sham. Accordingly, the transaction will be disregarded.

And so, Your Honor, we've got a court decision, the United States Tax Court declaring that these transactions are a sham. And so we think on the one hand, if the plaintiff wants to get into these and use them as evidence of licensing arrangements, that the whole story should come in. And we think that evidence should come in as well, what the tax court has said about these arrangements.

Now, I think it would be much easier to keep all of it out altogether because I think it's just going to be a sideshow, and we don't need this coming into a patent case. But if they are going to use these licenses with the jury, we think the tax court decision necessarily is implicated, Your Honor.

THE COURT: Response?

MR. COLLARD: Right. Your Honor, I'm going to come up to the lectern.

Your Honor, there's a little bit of -- lack of full disclosure I think on what that really said and what is going on in the tax court.

First of all, that decision's not final. There's ongoing litigation in the tax court. There's no final ruling. ACQIS has filed additional motions just last week on those issues.

Second of all, we're not going to talk

09:07 about the structure of the licenses, especially now
09:07 that we are able to admit the summary exhibit,
09:07 Exhibit 920, because there's no reason to.

09:07 The -- there is no dispute, and ASUS
09:07 knows this, that HP paid [redacted], Oracle paid [redacted]
09:07 [redacted] and IBM paid [redacted] And that's pretty
09:07 much the extent of the testimony we're going to go
09:07 into.

09:07 What they're talking about is what bucket
09:07 and how it got tax -- what the tax treatment was on the
09:07 back end. We're not going to talk about the tax
09:07 treatment of any of this revenue.

09:07 THE COURT: I'm going to keep the tax
09:07 court decision out.

09:07 MR. COLLARD: Thank you.

09:07 THE COURT: Anything else we need to take
09:07 up?

09:08 MR. UNDERWOOD: Nothing from defendants,
09:08 Your Honor.

09:08 THE COURT: Okay. I'll go back and get
09:08 the jury organized, and we'll come back out.

09:08 MR. COLLARD: We'd like to invoke the
09:08 rule, Your Honor.

THE COURT: Thank you.

09:08 MR. COLLARD: And there's one wrinkle in

that we think that Ajay Bhatt, one of the witnesses from ASUS, should be subject to the rule in light of your prior motion in limine clarification that he can only testify about things he has factual information on.

THE COURT: I have no idea who that is. Who is defendants' corporate representative?

MR. BURESH: This is Barbara Chen and Emma Ou from the two defendants.

THE COURT: Okay. So why would -- whoever the other gentleman is, why would he not be subject to the rule?

MR. BURESH: He submitted an expert report, Your Honor. He'll be testifying about a substantial amount of technical information, but he won't be offering opinions in this case. So --

THE COURT: If he's not offering opinions, then he wouldn't get to rely on what he heard in court and, therefore, he doesn't need to hear it. So I'm going to exclude him under the rule.

MR. BURESH: That's fine, Your Honor. Thank you.

THE COURT: Anything else?

MR. COLLARD: No, Your Honor. Thank you.

THE COURT: Okay.

09:09 THE BAILIFF: All rise.
09:09 (Recess taken.)
09:14 THE BAILIFF: All rise.
09:14 THE COURT: Please remain standing for the jury.
09:15 (Jury entered the courtroom.)
09:15 THE COURT: Thank you. You may be seated.
09:15 Jen, would you call the case, please?
09:15 DEPUTY CLERK: A civil action in Case 6:20-CV-966, ACQIS LLC versus ASUSTeK Computer, Incorporated, et al. Case called for a jury trial proceeding.
09:15 THE COURT: Counsel, if you would please announce -- tell me who is at your counsel table and introduce yourselves again to the jury, please.
09:16 MR. COLLARD: Thank you, Your Honor.
09:16 My name is Case Collard. I'm with the law firm Dorsey & Whitney, and this is Dr. Bill Chu, the CEO of ACQIS. And we represent ACQIS. And also with me at counsel table is Paige Amstutz. She's from the Austin law firm Scott, Douglass & McConnico.
09:16 Good morning.
09:16 MR. BURESH: Good morning, ladies and gentlemen. My name is Eric Buresh, and I represent the

09:16 defendants in this case, ASUSTeK and ASGL, which you all heard about on Thursday morning.

09:16 With me at counsel table is Ms. Kathleen Fitterling who will be working with me on this case. And our corporate representatives, this is Ms. Barbara Chen from ASUSTeK and Ms. Emma Ou from ASGL.

09:16 Thank you.

09:16 THE COURT: Thank you all.

09:16 Ladies and gentlemen of the jury, let me introduce myself to you now on the record. My name is Alan Albright. I'm the United States district judge for the Waco Division of the Western District of Texas.

09:17 Last week I was in Del Rio helping out, and I'm very happy to be home and back with you all again.

09:17 You're about to hear a patent trial. I don't know what your level of enthusiasm was when you got invited to come here and serve on the jury or if it went up or down when you actually got selected to serve on the jury, but I can assure you after having over -- a lot of trials now, I talk to juries in the end and they're always very grateful that they got to serve. I think you're actually going to find that this is a very rewarding experience.

09:17 You're also very lucky to have very

talented lawyers who are going to be doing the trial this week. That isn't always true. But I know these lawyers pretty well, and you have great good fortune this week.

So having said that, do you intend to do your opening argument at the beginning as well?

MR. BURESH: Yes. We do, Your Honor. Thank you.

THE COURT: Counsel, if you'd like to give the opening argument for the plaintiff.

A very short reminder. Ladies and gentlemen of the jury, this is just argument from counsel. They intend probably to give you a blueprint of where they anticipate the evidence will go. The evidence will not begin until they call their first witness. That doesn't mean that the opening arguments aren't important. They are. But they are just their arguments of counsel.

Yes, sir. Would you like any warning?

MR. COLLARD: Yes, Your Honor. A five-minute warning and maybe a one-minute when I'm really there would be fantastic.

Thank you, sir.

THE COURT: Sure.

OPENING STATEMENT ON BEHALF OF THE PLAINTIFF

MR. COLLARD: This case is about holding ASUSTeK and ASGL accountable for their unauthorized use of Dr. Bill Chu's and ACQIS' intellectual property. The evidence will show that Dr. Bill Chu invented and patented a new computer bus.

Now, I promise I'm going to come back to what a computer bus is. But this computer bus was so ahead of its time that almost the entire computer industry got on board and took a license and paid to use Dr. Chu's patented technology. But not ASUS.

And even though over 20 computer companies have taken licenses to pay for the ACQIS patents, ASUS still refuses.

Now, ASUS has many subsidiaries, and they will try to hide behind its corporate structure. But make no mistake, ASUSTeK is in charge and needs to pay for its use of ACQIS' property.

Now, we got to talk just a little bit during jury selection last week. And my name is Case Collard --

I can start anyway.

My name is Case Collard, as I said, and I'm really honored to be here with you. I know Judge Albright has done a lot of these trials, but we don't get to do them all that often and it's really exciting

09:20 for us to be here and having this trial with you. This isn't something we get to do every week.

09:20 And I'm honored to be here representing ACQIS and Bill Chu.

09:20 As the Judge said, this is the opening statement of ACQIS, and my job here is really to give you a roadmap, to tell you the kind of evidence that we want to bring in to prove our case over the rest of this week.

09:20 And we'll show what I already talked about, that the defendants infringed Dr. Bill Chu's patents and that their infringement was willful. We'll talk about that a little more too. And that because of that, they owe him damages.

09:21 But first, I want to thank you again. I thanked you last week, but I want to thank you for your service. You're taking time out of your whole week. And in every case I've been a part of, the jury really takes this so seriously. We really appreciate that. The lawyers, the clients appreciate that.

09:21 This is a really unique part of our system. The idea that people from our community decide disputes is a really unique and American characteristic. And it's in the Bill of Rights. It's Amendment No. 7, the right to a jury trial.

09:21 So even for high-tech patent cases, this system works. And it's uniquely American.

09:21 So we'll aim to be as efficient as we can giving you the information that you need and hopefully making everything as clear as possible. That's our job. And we're going to try and do our job.

09:22 We have some great teachers who will be witnesses, including Dr. Chu, who you'll meet today. And I'm excited for you to talk with him -- or hear from him.

09:22 I know you watched the video about patents that we talked about, the 17 minutes. I watched it over the weekend again, and it does a good job. But I want to talk just a little more about patents to kind of set the stage.

09:22 Now, this was in the video, this discussing how patents are property, intellectual property. Not real estate, but there are some parallels. And so we cleaned that graphic up a bit.

09:22 And there are fences or boundaries to property. And in a patent, there are boundaries too. And they're called the claims, and they describe what was invented. And that's kind of like the description of the property in a deed.

09:22 Now, Texans know about property. I told

you I was a Kansan. Kansans know about it too. One of the things that we know about property is that there are rules. You have to ask permission to enter someone's property. Maybe you have to use a gate.

And we're going to prove that the ASUS defendants used Dr. Chu's property without permission. And the patents in this company, now they're owned by Dr. Chu's company. It's called ACQIS. And ACQIS was founded by Dr. Chu.

Now, patents are a unique type of property. They're intellectual property. They're not real estate. And as you saw in the video, they're unique in one way because they're protected in the Constitution.

Article I, Section 8, I think it's Clause 8, but: The Congress shall have the power to promote the progress and science of the useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

Dr. Chu is the inventor. He and ACQIS have the exclusive right to the patents. And I'm so excited, as I said, to introduce you to Dr. Chu. I've known him for 15 years, and his story is uniquely American.

He was born in China. His family fled the communist takeover of China and went to Hong Kong. They lived in Hong Kong, and he went to -- grew up there. He came to the United States to go to college at one of our top universities, the University of California at Berkeley. He received a Ph.D. in electrical engineering at the young age of 25.

He spent his career living and working in Silicon Valley improving computers throughout the 1980s and 1990s, helping lay the foundation for the computers that we use today, the tiny computers that we often have in our pockets or -- I don't know if you guys got to bring them in -- or out in your cars.

And after decades in the computing business, he was building companies. He was overseeing giant teams of engineers. In the late 1990s, Dr. Chu made a breakthrough. He'd just left his position at a company called Cirrus Logic, and he had an idea for a new product and a new company.

And I'm going to talk about a new product and a new company, but before I do, I got to take you back to 1998. Because it's important not to think about computers as they are now in 2024 but about how things were in 1998.

George W. Bush was still governor of

Texas. The iPhone wouldn't come out for another ten years. Even the iPod didn't come out for another couple of years in 2001. Computers in 1998, they were bigger. They were slower. The Internet existed, but it wasn't wireless, and it wasn't as fast or available everywhere like it is now. That's what computing was like back then.

Now, now that we're back in 1998, I want to tell you about the new product. And it was a new computer system, and I have one here. It's called the Interputer and the iMod.

So we all know laptops and desktops, computers. And this was a new idea. Dr. Chu thought to put all the key parts of the computer, the guts, the processor, which is the brain of the computer, the memory, in this one module and have other parts in a console.

And if you were at work and you had this in the console at work and you wanted to go home, you took this out, take this home, you have another one of these at home, you plug it in, you're working on the exact same computer.

It's kind of a cool idea, because this is smaller than my laptop is today. It's barely as big as a tablet. And this was 26 -- 25, 26 years ago.

But for this to work, it had to be small and it had to be fast. And not just as fast as the desktops and laptops existed at that time because it has to keep working as the processor and the computer gets faster and faster.

So Dr. Chu didn't just come up with this -- this new form -- this new form for a computer. Not -- that's a little different. This is the inside of this. He redesigned the inside too.

Now, I'm to the part where I said I would explain. I'm to the computer bus. A computer bus is a communication pathway. It's a way for communication and data to travel between different components inside a computer.

If a computer is like a city, the bus is a little bit like a road connecting those different parts of the city. So this is a little bit of an example that we made, a diagram of a computer bus where we put a little road to show you that that's the connection.

Now, a computer bus is made of wire. It's really a little wire or a little trace of wire on this -- this is called a circuit board. That's what -- a computer bus is connecting these different parts.

And there are a lot of -- there's a lot

09:28 of data, a lot of information that needs to move around
09:28 on the computer. And there can be traffic jams and
09:28 slowdowns.
09:28 And the computer buses at the time that
09:28 Dr. Chu came up with his invention in the late '90s,
09:28 they had some problems. Too slow, too many wires so
09:28 they take up too much space, too many errors.
09:28 And so he invented a new computer bus.
09:29 That's how he addressed the problem. He said, I'm just
09:29 going to invent a whole new computer bus for my
09:29 product. And he made some key improvements. This is a
09:29 little bit of the technical stuff, but I'm going to
09:29 explain it a little bit. And then like I said, we have
09:29 other experts that are going to explain it even more.
09:29 He made changes to those wires and those
09:29 communication pathways. That's what he really did. He
09:29 said, I'm not going to use this old kind. I'm going to
09:29 use a new kind when I'm designing my product.
09:29 The first thing he did was chose a
09:29 low-voltage channel. Voltage is the amount of energy
09:29 basically. Using a lower voltage means it's less power
09:29 hungry. It means, if it uses a battery, it can have a
09:29 longer battery. And it's actually even faster because,
09:29 if you don't have to charge up to a high voltage, it
09:29 can charge up a little faster.

09:29 So that's the low-voltage piece.

09:29 Then differential signal, I think this is cool. The differential signal is a way to avoid errors. And on a computer -- have you ever taken your phone and, like, if you turn on the microwave, you hear a weird sound on your phone, or you hear -- if you're next to a speaker or something, you get a little feedback with your phone?

09:30 That's electrical interference. And all of these components use electricity. And so they create just little bits of electrical interference, which doesn't matter, you know, if you're this far away from the computer. But if everything's this close together, then that interference can matter. The differential signal, it cancels out that interference and reduces errors.

09:30 The next one on my list is unidirectional. This is a computer engineer thing. Why did they say unidirectional? They could have said one way, because it means the same thing. It's one-way communication. We had some stop lights on our diagram, and some buses were like an intersection where if you want to send information but when you got a red light when you pull up to the intersection, then you have to wait.

09:31 Dr. Chu's bus was like a highway. One lane going eastbound, one lane going westbound, and you don't have to stop. So that was a unidirectional channel.

09:31 Now, another new aspect of Dr. Chu's new bus was that it was serial, not parallel. So what does that mean?

09:31 So this is the old bus. This is parallel. Parallel means those -- all those little ones and zeroes, that's data. Those are bits. And look at them, side by side, just walking side by side across all of those lines. So that's parallel communication.

09:31 The new bus was serial communication. Follow the leader. The data can just follow the leader, and you need fewer lines for this type of serial communication. So it takes up less space. And as you can see, space is at a premium inside a computer. So this had some key benefits.

09:32 Dr. Chu was the first one to design a computer bus that was unidirectional, low voltage, differential signal, and serial.

09:32 This was genius. I know you may not, you know, know that because we don't know a lot about computer buses, but this was the genius part. That --

09:32 and these benefits, smaller, faster, lower power, these are the gold standards of computers. This is what consumers and computer companies want in a computer. Just like phones, they want to make it more powerful, smaller, and faster.

09:32 And, oh, there's one more. I forgot.

09:32 It was backwards compatible. So his changes were to those physical wires and the design of everything inside the computer, but he wanted to make sure that it would still work with older components, even if they weren't necessarily expecting to have his new bus in the mix. So these changes were to the hardware, to the physical wires and design of the computer.

09:33 And one of the cool parts about this and a pretty important part for us today is that this new bus, it didn't just work with his modular computer. It worked with any type of computer. With a server, with a laptop, with any type of computer. And so that is part of why we're here today.

09:33 So that is the new product. This is the new company. The new company was ACQIS. It was founded to work on his new computer and his new computer bus.

09:33 And there was initial buzz and sales, you

09:33 can see. It was written up in magazines. Then at the
09:33 time, people got hard copy magazines like WIRED and PC
World.

09:34 And he sought patent protection over all
09:34 the parts of his invention, including his new computer
09:34 bus.

09:34 Now, why did he seek patent protection?
09:34 He thought his new invention would be important. And
09:34 he wanted to strike that deal that you heard about in
09:34 the video, where you tell the Patent Office how your
09:34 new invention works, and you get the exclusive right to
09:34 develop and use it just like it says in the
09:34 Constitution.

09:34 So Dr. Chu, he received the patents that
09:34 we're here about today. Got all five of them.

09:34 Now, you may be asking yourself,
09:34 Mr. Collard, why are there five patents? And we're
09:34 going to talk about seven claims in these five patents.
09:34 Why not just one? I will tell you.

09:35 We were talking about how do you design
09:35 the inside of a computer. Well, there are lots of
09:35 different ways to do this. And Dr. Chu was thoughtful
09:35 about all of those different ways that his new bus
09:35 might be useful, and he wanted to disclose different
09:35 configurations that showed all the different ways that

his new bus could be used.

And so Dr. Chu did this work on his bus, remember, in the late 1990s. And then those magazines were from 2001. And he started applying for patents back in the late '90s as well.

But in the mid 2000s, as computers were getting faster, other computer companies, other people in the computer industry started running into the exact same problems that Dr. Chu had run into when he was designing his new computer, and he anticipated those problems.

So as other people's computers were getting faster, there were bottlenecks and traffic jams and interference and running out of space for more wires, so computer companies started making some changes to how they designed their own computer buses to overcome those problems. And they started adopting the same solutions, unidirectional, low voltage, differential signal, serial, the same solutions that Dr. Chu had thought of, written down, and submitted to the Patent Office years earlier.

Here are two examples that you're going to hear about: PCI Express and USB 3.0.

Okay. Now I want to talk to you about something important about patent law. Dr. Chu was

first. It's really important. He was first. He was the first one that designed a computer bus with all of the elements that we're talking about and received patent protection on it, ultimately.

So anyone that did it after Dr. Chu and ACQIS needs a license if the technology in their product is covered by ACQIS' patents. And this is regardless of whether they actually knew about the invention in the patents or not. They didn't have to actually know.

Now, Dr. Chu did tell ASUS about his patents, and we're going to get to that in a second. And after he did, ASUS still did not take a license, which is wrong.

But Dr. Chu kept an eye on the computer industry, and he saw that they were adopting these same improvements to their bus that was covered by the claims of his patents. So he informed a lot of computer companies about his patents and that they were using ACQIS' intellectual property, and a lot of computer companies agreed to get permission to use ACQIS' technology.

They paid for licenses. And it's a lot of companies you know.

A license is permission to practice

what's in ACQIS' patents in exchange for money or other compensation. It's just like if somebody wants to use your land to hunt or drill or put up a wind turbine, they have to pay -- they have to compensate you to use your property.

And imagine if they didn't. Imagine if they just came on your land without permission. And if you told them to leave or pay, they said, no. I'm just staying.

In other words, computer companies that paid money to ACQIS have the right to sell computer products that work or made in the way that's described in those claims of ACQIS' patents. It's really a lot of companies that have paid ACQIS to use its property: Dell, Samsung, Microsoft. But ASUS has not.

And that brings me to the ASUS group. And like a lot of multinational companies, the ASUS group is made up of a parent company and lots of subsidiaries. We're going to talk about two subsidiaries. But a parent company and lots of subsidiaries.

Now, ASUSTeK Computer, Inc. is the parent company that owns ASGL. ASGL is the company, it's the shipping company, essentially, that ASUSTeK uses to make sure their products get to the U.S.

09:39 And ASUSTeK also owns another subsidiary called ACI, and that's the company that ASUSTeK uses to sell computers in the United States.

09:39 Now, ASUSTeK will try to hide behind ACI and maybe ASGL, but let there be no mistake, ASUSTeK is running the show.

09:39 So the patents in this case, the patents that we're going to talk about in this case, these patents, they are on this slide, and they issued between December 2013 and December 2016. That's these five patents.

09:40 And Dr. Chu sent a letter to ASUSTeK in May 2018 telling them about his patents and that other companies had already paid for licenses, and he asked ASUS to take one too.

09:40 He told them specifically about these five patents. He put these five patent numbers in the letter. He told them about the types of products at ASUS that he thought were relevant to the patents, and he told them about the type of technology, the serial bus technology that he thought was relevant to the patents.

09:40 And he sent the letter via FedEx. And he got delivery confirmation, and he addressed it to the CEO of ASUS.

09:40 Now, you may hear ASUS claim they don't have a record of receiving it, but Dr. Chu has a record. FedEx has a record.

09:41 Now, ASUS ignored him. They kept selling products with his intellectual property. And after he sent this letter, that is when ASUS' infringement became willful. I mentioned that word before, and it means they knew what it was doing. And you may be asked to decide that issue later.

09:41 And Dr. Chu's only option to enforce his patents and protect his property at that point is to come to court. That's what you have to do if someone won't agree to take a license. And that's why he started this case back in 2020.

09:41 Since 2018, when he sent the letter, since 2020, when he started this case, ASUS has not agreed to pay for their use of ACQIS' property.

09:41 So we're here this week to ask you to require the defendants to do what's right, to pay what they owe just like all the other major computer companies. You know, it isn't fair to ACQIS, and it isn't fair to all the other companies that did the right thing and paid ACQIS for permission.

09:42 Now, I want to explain to you just a little bit -- just a little bit more detail about

09:42 infringement and what it means to show infringement and how we're going to do that so you know what to expect when we get to that part of our case.

09:42 So we hired an expert. And he's a professor of computer engineering. His name is Dr. Nabil Sarhan. And he analyzes the ASUS products, and he compares them to the patents to determine if they infringe. He analyzed more than 500 accused products in this case.

09:42 And what you see here, you'll see something like this later, and it's a checklist. This is the claim. This is those boundaries of the invention.

09:42 And so you'll see something like this. He'll walk through, and he will tell you why, in his expert opinion, this claim is met for this or that product.

09:43 It would be really hard to do that for 500 products in a week. We don't have to do that. We have agreed on two representative products. So these products represent all the accused products in this case, and the parties have agreed on that. And so he'll do his analysis for these products.

09:43 Now, a tiny bit about damages and how we intend to show damages in this trial.

As a jury, your power to -- your tool, your power to address this dispute, to address the use of ACQIS' intellectual property without permission, is to award damages. And there's a whole specific method that we will go through to show you what we think the damages should be. Give you a very brief preview of that.

It centers around something called a "hypothetical negotiation." You literally imagine the parties going through a negotiation and say, what do you think, in this hypothetical imaginary negotiation, where would the parties have ended up?

That's kind of how the whole thing works, but there's a lot more specifics to it. And you'll hear from -- we have an expert that does this kind of analysis. His name is Justin Lewis. You'll hear from him. He's been doing this for a long time.

THE COURT: Counsel.

MR. COLLARD: Thank you, Your Honor.

He starts by looking at the parties' past activity in licensing, like what did ACQIS do, what did ASUS do. That's kind of the first thing. That's how they approach real negotiations, and that's a good clue on how they would approach a hypothetical negotiation.

And then he does a calculation. And I've

got kind of a simplified version of the calculation. So the calculation starts with the number -- the sales number for products that we contend have infringed the patent in the -- in the time period of infringement.

And I actually want to point out to you the patents are expired, but you really shouldn't let that concern you. They expired in -- the last ones expired in 2020. But we wouldn't be here today if that meant that we couldn't have a suit about the patents.

You can go back in some cases six years, but you can certainly go back to the notice letter. So you'll hear some discussion about that, patents being expired, but I don't think you should let that concern you.

So he looks at the sales during the key period, and that number, we'll get -- he'll get a specific number, but that number is over 4 billion. And then he does something to that number. It's called the "apportionment factor." Again, I'm not going to delve into that too much during opening.

But he doesn't take the whole amount. He focuses on the parts of the product that benefit from Dr. Chu's invention. So there are parts that maybe aren't really related, and they try to factor those out. So that's -- the number goes down. This reduces

the number. And that's your base. It's still over 3 billion.

And then he comes up with a royalty rate, and that's a percentage. And it's a percentage of sales that, in his expert opinion, ASUSTeK would have agreed to in that imaginary negotiation to pay ACQIS in order to continue to have the right to sell -- to sell products that benefit from ACQIS' invention. At least the right to sell during that period.

Now, that number is 1 percent, 1.15 percent. Just a little over 1 percent. And that is in line with what other companies -- we saw that slide -- that's in line with what the other companies have agreed to pay ACQIS to benefit from ACQIS' property, its patents.

And so then you multiply that percent times the base and that comes to 39.5 million. Just a little bit over that. And that number is based on actual prior sales of computers in the United States, and it's a small percentage of the 4 billion that ASUS has made on those sales.

And that amount, that 39.5 million, previewed this last week, is the amount that ASUS should be required to pay to ACQIS in this case.

So why won't ASUS do what's right? ASUS

09:47 is going to have some excuses to try to justify their actions. This might stick in your memory. I hope it does.

09:47 I once heard a senior lawyer, his name is George Chandler, and he is a graduate of Baylor law, actually. And he described a dog bite case that he had, something he calls the Fido defense. And if you come into a courtroom and you say you've been bitten by a dog, the other side, the side that's the dog owner, might say, it's not my dog. I don't own a dog. That might be the first thing they say.

09:48 Well, then you prove that they own the dog. And the next thing they say, well, okay. It's my dog, but it didn't bite you.

09:48 And then the -- if you prove that the dog bit you, then the next thing they say, well, it didn't hurt you very much. And --

09:48 THE COURT: Counsel.

09:48 MR. COLLARD: Thank you.

09:48 I think you're going to hear the Fido defense from ASUS. I think you're going to hear, you got the wrong company.

09:48 I think you're going to hear, those patents, they're not even valid. And even if they're valid, they're not infringed.

And remember from last week when you heard the jury instructions, validity is a very high bar. They have to prove by clear and convincing evidence. That means you can have no hesitation.

So if you don't go for that, then they're going to say, well, that's minimal damages.

The Fido defense is a lighthearted example, but it stuck with me for a long time, so I thought it might help you.

Dr. Chu has a right to protect his property. His intellectual property is protected in his patents as required by the United States Constitution. The ASUS defendants cannot use Dr. Chu's property without paying for it. And intellectual property and patents, it represents our ideas.

This is Dr. Chu's genius, his ideas, his decades of hard work. He invented new computer bus technology that ASUS benefits from. He told them about it, but ASUS imported and sold computer products in the U.S. for years without his permission.

Now, we come to you as a jury to make the final decision on how to handle this dispute. And at the end of our case, we will be asking you to find that the ACQIS patents are valid, that they are infringed by the defendants, that that infringement was willful, and

that the appropriate damage amount for ASUS -- the ASUS defendants to pay ACQIS is 39.5 million to account for that infringement.

We trust you'll do what's fair. Thank you very much.

THE COURT: Thank you, sir.

Counsel?

OPENING STATEMENT ON BEHALF OF THE DEFENDANT

MR. BURESH: Good morning again, ladies and gentlemen. And I know you heard my name on Thursday, and I just mentioned it again. But I want to make sure we are all on equal footing. I know you've sent in your questionnaires and you told us about yourselves, so I want you to know who I am too.

I am a lawyer from Kansas City. I grew up further west in Kansas. I have been married to my wife Terah, which is a name out of the Old Testament from Abraham's family, been married to her for 28 years now. We have four boys. They're not boys anymore.

My oldest, Ethan, is married and out of the house. My second oldest, Noah, is married and out of the house. My third son, Grant, is not married, but he's actually living here in Waco and is out of the house.

And then we had a little bit of a

surprise. His name was Hudson, and he's a junior in high school, so he's running a little bit behind the rest of them. We actually nicknamed him the closer when he came through because, well, he's the closer.

So that's me.

I also know, as you sit here in the jury box, a lot of times you can be looking around the room and wondering what everybody's doing. Like, what role do they play? So I want to introduce the rest of my team as well.

You met Travis Underwood. He's on my team from here in Texas.

Some other folks you'll hear from is Michelle Marriott, who's with me up in Kansas City.

Mark Lang, you won't hear from him, but he runs everything for us behind the scenes and keeps us going smooth. So he has a very important job.

Ms. Kathleen Fitterling, who I introduced a moment ago. She is the brains behind me, candidly. She's the smartest one at my table that works with me.

Ann Marie is --

Could you raise your hand, Ann Marie?

She's our paralegal. She keeps everything organized, which we wouldn't be able to do anything without her.

And then Mr. Derek Palisoul, sitting back there behind the computer screens. He makes all the magic happen on the screens in front of you. And I'll just tell you upfront, if I get off track and something's not appearing and I'm mixed up, it's not Derek's fault. That's my fault. I've gone somewhere astray. So don't blame him.

That's our team, and we are happy to be here. We -- really, it is our pleasure to both appear before this Court, to appear before you all, and it's our pleasure to represent ASUSTeK and ASGL.

And we are here to tell you that all the somewhat nasty things that are being said about these companies, they're not true. We deny all of them.

And as you all know, when you came on Thursday morning and -- one of the things you raised your paddles to, if you remember, is that companies that are accused -- that are wrongly accused, they get to come into court and they get to defend themselves. That's what we're doing.

I want to introduce a couple of important folks. These are the witnesses, the representatives of the companies.

So the first company that we're hearing about is ASUSTeK. Now, they are located on a small

island off the coast of China that I'm sure many of you have heard of called Taiwan, okay?

And from ASUSTeK --

If you could wave.

-- is Ms. Barbara Chen. All right. And she'll be testifying to you in a few days when it's our turn. All right.

Another island in Asia where ASGL is located, this is called Singapore. All right.

And, Ms. Emma Ou, if you could wave.

Ms. Emma Ou is from Singapore.

Now, these ladies get the blue ribbon for having traveled the longest distance to be here. And they have come here to be with you, to talk to you because they want to raise their paddles. They want to say exactly what I've said. The allegations against them are wrong. That's why they're here.

One company you've also heard about --

Is that red dot working for you all when I put it on the screen?

Okay. Thank you.

ACI. Now, we're being accused of hiding behind ACI. We're not the ones talking about ACI. Okay. We're not -- we claim the puppy. It was a cute puppy by the way. We claim that puppy. We're not

hiding behind anything. It's the plaintiffs that are talking about ACI.

And this is weird. I want you to watch out for this, okay?

So here's the deal. When you look at one of your patents in your notebooks, you're going to see on it: United States patent. United States patent. That's because it deals with United States activity. That's what they're designed to protect.

Now, these two companies -- and you will hear this from Ms. -- from my clients. You will hear that they don't do anything in the U.S. You will hear from plaintiffs that ACI does activity in the U.S. But ACI isn't here.

And one of the questions I want you to ask is: With a company sitting here in California, why did the plaintiffs choose to drag people from clear around the world and not sue ACI?

Maybe they'll explain that to you; maybe they won't. I don't know. But it's a question. That's all a side dish, okay?

The main course, the ribeye, if you will, is a patent infringement case. And questions before you are going to be: Did ASUSTeK and ASGL use the patents? Did they use Dr. Chu's technology?

And the answer is unequivocally no.

We're going to have to walk through that over the course of a week. I'm not going to try and firehose you all this morning, okay? There's no possible way that I'm going to explain computer buses in 30 minutes.

So we're going to spend the week doing that. And at the end of it, you're going to see we don't use their technology, period. Hard stop. We don't do it. Okay?

But before we get into all that, look around this courtroom. It's kind of an impressive place, isn't it? You've got the high bench for the Judge, which is symbolic. His authority.

I'll also tell you that the power in this case, in this jury trial, it rests right here in the jury box. The Judge ain't going to be deciding this case. You guys will be, okay?

You're the power in this room. Not to disrespect His Honor's authority; he runs the case.

This big beam running across the room here with the little gate in it, you see that? That's called the bar.

Now, what does that symbolize?

That symbolizes that this whole area on

09:57 this side of the room is set apart from the other area. See, out there's the public, and in here is the sacred place, the set apart place.

09:58 Why is it sacred? Why is your job important?

09:58 It's because this is where, in this sacred area, we find truth. In this sacred area is where we do justice. Just -- in a patent case, just like any other case, we seek truth and we do justice. That's important.

09:58 Now, y'all might be sitting there -- I do this a little bit, so I know the juries will sit here and you folks are saying, how in the world am I supposed to do justice when we're talking about patents, because I don't know anything about patents? How am I supposed to do justice when we're talking about computer buses and technology and all that when I don't know anything about those?

09:58 Let me tell you how, okay?

09:58 This is why the jury system works. Each one of you have your life stories, right? You've had your ups; you've had your downs. You've had your bumps and bruises. You've had your successes. You've seen some good people, and you've seen some bad people.

09:59 All those stories come together to give

you each individually what we call common sense. Y'all agree with that, you have some common sense?

Now, when you get in the room and there's seven of you all coming from your different angles with your own common sense, it is powerful. It's a powerful thing. And what it enables you to do is smell the truth, to sense it. You will know who's right. You will know where justice lies. You will know where the truth is because of your common sense.

Now, one of the -- as I look at a case, I like to kind of take a step back, look at it and say, what's the thread? Okay. What's the thing that ties this all together?

And in this case, the thread of common sense that ties it all together is this: You only get credit for the work that you actually do.

Let me say that again: You only get credit for the work that you actually do.

You spin it around. You don't get credit for the work that you don't do.

Is that common sense?

Okay. Keep that thread in mind. It's really important in this case.

This is a -- the same basic timeline. It looks a little different, but we're going to talk about

10:00 the same dates here.

10:00 In January of 1998, Dr. Chu came up with an idea, and he wrote it down on something called "white papers." That process took him three weeks to do, okay, just write his ideas down. White papers. We're going to see them. Watch for those as they come.

10:00 This early time frame is really important. All right.

10:00 After that he filed some patent applications. The first one was in May of 1998 and then May 1999 and May of 2000, through that window. Patent applications. We will spend a lot of time looking in that time window because what he actually did, the work that he actually did is really important.

10:01 Why? You remember the barbed wire fence from Mr. Collard's opening statement? The barbed wire? That barbed wire don't get to move as time goes on. Okay? Keep that in mind. Those fences, once you've stunk -- once you have -- not stunk them -- once you have sunk them in the ground, they need to stay put. Keep that in mind.

10:01 So what work did Dr. Chu actually do in this early time? I have this pretty picture. We'll see this out of the document, but --

10:01 May I borrow this, Dr. Chu?

10:01 This is it. It's called an "attached computer module," okay, that you would slide into a console. Okay? And then they would need to talk to each other. We're not talking about computer buses inside of here. We're talking about how this talks to this once they're put together.

10:02 Dr. Chu called that ability to talk, that channel, if you will, he called it an "XP Bus." XP Bus. Stood for cross peripheral, between this and this. Okay?

10:02 You're not going to see anything like that from my clients. You're not going to see anything remotely resembling that from my clients.

10:02 That was the work that he actually did. And we'll get into this XP Bus as we go forward.

10:02 Again, lots of details. Look for that as we move through the case.

10:02 Why is it important to keep the fence posts in the same place? Because technology moves quick. Do y'all remember what technology was like back in 1998? Did anybody have a phone in their pocket back then?

10:03 Where are we today? It's an eternity.

10:03 I mean, you know, going back to our puppy, you know dog years, 7 to 1 or whatever.

Computers are like 50 to 1. They go so fast.

What was happening in the industry?

So as Dr. Chu was messing around with this thing, the Interputer, the rest of the computer industry had come together to develop the technology that we're actually using today in all of our computers. Okay? They're called "standards."

Why are they called standards? It's not mysterious. It's because they're standard. They're in everything. Okay?

You all know USB. I'm going to talk about that first because it's more comfortable.

USB is -- you have them everywhere. You can plug a USB cord in and charge your phone in your car. If you go to a hotel room, you can plug it into a lamp to get power to charge your cell phone.

You plug, you know, a mouse into your desktop computer with USB, a keyboard USB, a monitor USB. You use a USB for everything. It's prolific.

PCI Express is inside of computers, and it's the way a processor will talk to memory or a processor will talk to another piece of your computer. Okay? So it's inside.

The industry came together over a number of years. These projects take on average three years,

and they involve 50 different companies, hundreds of different engineers from those companies. And they're the brightest minds.

You get the very best to come together to do these standards because they're going to be in everything. And you want to know something? They give those standards away for free. They give them away for free so that we all can enjoy them.

I'm doing terrible with this microphone.

So that they -- we all can enjoy them. They're in all of our computers. That's why.

I want to introduce somebody who's not going to be in court with us until he testifies.

This is Mr. Ajay Bhatt. He used to work for Intel. And Ajay Bhatt invented USB. He developed the USB 3 that we're going to be talking about in this case, along with a team of about 200 other people.

He also -- after he was done working on USB, he developed PCI Express, another three-year project.

His mom is elderly. They live in Portland. He's the primary caregiver to his mother, so he's not going to be with us the whole time. He will just come in, he'll testify, and he'll leave.

But I'm looking forward to his testimony.

He's done the work. Okay? He has done the work on these standards. He's brought us this technology, he and a lot of other people.

Among those companies that were involved in doing this, ASUSTeK, in developing this new technology that we're actually using in our computers.

So I look forward to meeting him. I look forward to sharing his testimony with you.

Now, let's close out some more of the story.

After the industry has developed PCI Express and the industry has developed USB, we need to jump ahead from May of 1999 to May of 2018. Okay? That's approximately a 20-year jump.

And what does Dr. Chu do?

In May of 2018, he sends a letter to ASUSTeK. And he's looking back in the rearview mirror across time. And he says, PCI Express and USB are pretty cool. They're in everything. I did that. Okay?

From Interputer to -- I've changed the computer industry with brand new technology that is amazing and works for everyone. I did all that work.

That's a big claim. That's a massive claim. And it's not true. He didn't do that work.

Y'all ever hear of a fisherman's tale? Like I caught a fish and three years later, it's twice the size of the one I actually caught? That's happening here too.

Let me tell you a story. I was -- this is in high school. Now, up in Kansas, we have bass, crappie, channel cat. I think that's the same stuff you're going to have around here in Lake Waco or whatever, but correct me if I'm wrong.

We were fishing for crappie, a buddy of my mine named Andy and me. We were going from brush pile to brush pile. Hit this one brush pile that had crappie stacked in it like pancakes at the IHOP. I mean, they were thick in this brush pile.

We're jigging. All of a sudden, we start hitting the fish. We caught 32 fish in about 25 minutes. It was intense. I know how many fish we caught because we took them back to my truck. We laid them out in the bed.

And I had one of those portable throwaway cameras that used to be around in the day before we had phones that took pictures. I snapped a photo. I have that photo.

Now, my buddy Andy, he's an excitable fellow. About two years later, we're still fishing. He's talking about that day. He said, I bet we caught

40 fish that day. That's okay.

I saw him ten years later. We were recounting that story. It was 50 fish.

Just last year I was with him. We went fishing again. And he goes, you remember that day on -- it was Lake Perry. He goes, you remember that day on Lake Perry?

I said, yeah. What's he going to say? What's he going to say?

My buddy Andy says, we must have caught 100 fish that day.

Okay? That's ten years after the -- that was 15, 20 years after the fact. The story got bigger, and so is Dr. Chu's.

That's why we got to look at those early days and say, what was the work that he actually did? Okay? What did he actually do? We don't get to wait 20 years later and then listen to his story. We got to go back and see what it actually was.

I want to ask you a few commonsense questions now. Okay? Looking at this timeline, we have three weeks worth of writing white papers in January of 1998.

Does it make sense that three weeks worth of thinking is the same as all of the industry experts

coming together, 200 of them, over the course of not one three-year period but two three-year periods and developing brand new technology? So six years worth of work for the whole industry or three weeks? Does that make sense that he's doing the same work?

Let's try this from a different angle. Does it make sense -- let's go back.

Barbed wire, you just heard about that. Barbed wire. Man, my clients got out their snippers and they cut through that barbed wire. That's the allegation, right?

Now, does anybody own property? I think you said you did. Yeah. If you have barbed wire up and somebody's going to come traipsing through your property and they cut your barbed wire down and start, you know, laying pipes or cutting timber or whatever it is they're doing that you don't want them doing on property, what do you do?

Well, I know what Dr. Chu did. He waited for 18 years to say something.

Now, let me be more accurate. More accurate. PCI Express came out in 2003, and this isn't a secret document. It's an industry standard. It's free to everyone. Everybody knows what's going on.

ASUSTeK starts using it in their

computers in 2004. Okay? So let's assume that's when they cut the barbed wire.

Now, does it make sense -- if there's a legitimate claim from Dr. Chu, does it make sense that he sits on his hands for 14 years from that point? That's hard to fathom. If somebody's jumping on your property and doing something you don't want them to do, you stand up and say something. You don't wait for 14 years.

But I'll tell you what he waited until. If you look closely at this slide here, you see May 15th of 2019. That's when his patents started expiring. He sent his letter one year to the day before his patents started expiring because he was running out of window to do all the stuff he wants to do, which is sue.

That's why he sent a letter. Not because he had the legitimate claim; because his windows closed after 14 years. Does that make sense?

Let me give you another fact. Now, I've added a data point on this screen here. November 1998 to April 2000. You see that one? Here, I can use my -- right there. That's when Dr. Chu was working on his Interputer, trying to get this module to talk to the console.

And remember the XP Bus that I mentioned earlier? I'll give you another fact. It never worked. The XP Bus didn't work. Dr. Chu, with his impressive education, couldn't get it to work. He tried. Hired other engineers and tried. It didn't work.

Does it make sense that his XP Bus that didn't work, that he couldn't get to work, is the same technology that all of the best minds in the industry came up with over the next eight or nine years?

Does it make sense that the best minds in the industry somehow decided to use the technology that Dr. Chu couldn't even get to work?

None of that makes sense. Because the reality is what he's saying isn't right. The work that he did has nothing to do with these standards that we're talking about here today.

Let me introduce another gentleman.

Dr. Edwards, could you stand up? And sit back down. Thank you.

Dr. Edwards is a professor at Columbia University. He has been what I would call monkeying around with computers since he was 12 years old. Okay? He loves computers. He's a professor talking about computers. He teaches classes on all this stuff. He has a love for computers that I don't personally share,

but I'm happy to talk about it with him. Okay?

He will come and teach you everything you need to know about the details here. He'll walk you through this early time frame. He'll walk you through these standards, talk about the things that Mr. Bhatt developed. And he will show you that they're totally different. So wait for that testimony as well.

What Dr. Chu is doing is ignoring the context of his work. He's growing the number of fish.

Let me give you another example. I'm a littler boy now, okay? I'm talking five, six years old, and we lived in a small town.

Now, when I would do my chores well during the week, my dad would sometimes take me to this little five and dime in the downtown. It was called Woolworth. Y'all ever heard of that store?

Woolworth was -- it was great. They actually had a fountain where you could get soda -- sodas. And anyway, that's neither here nor there, and I'm not focused on that.

But the idea was we'd go in there and there is this little toy aisle, and my dad would say, you can get whatever toy you want off of this. Now, they were not fancy toys. They were about -- I think the most expensive one was maybe a buck 50, but I could

choose whatever I wanted off there. And --

THE COURT: Counsel, you have five minutes.

MR. BURESH: Thank you, Your Honor.

Three times I chose this toy airplane. They're in this plastic bag. This toy airplane was made out of light wood, balsa, if anybody knows what that is. And they had a propeller and a rubber band, so you could spin it up and the rubber band would act as the motor. All right.

Now, I'd go home with this toy airplane, I'd wind it up, and I'd let that thing go. In my mind, it was going to do loops and fly around for five minutes and be beautiful. Any guesses on what happened?

I'd spin it up, throw it, (indicating). Every time. I was so disappointed. That plane didn't work worth a diddle, all right?

But here's the thing: How does that apply to what we're talking about?

Let's say I was the inventor of that toy airplane, so I get my papers out, I write it down, I say I'm inventing a toy airplane. It's made of light wood. It's got wings. It's for flying. It's got a motor with a rubber band. Okay. That's my work.

10:17 That's what I'm entitled to credit to.

10:17 Now, let's say I wait for 18 years. I let 18 years pass. And then I think, man, that toy airplane isn't doing very good. But I see that the Air Force has come out with some pretty cool stuff. The Air Force has come out with their F-35 stealth fighter plane. It's amazing technology.

10:17 Now, what I think I really invented was an airplane. Let's don't worry about the toy. Now, it has wings. It's got a motor. Let's not worry about the rubber band. And suddenly, the Air Force gets a letter that says I invented the F-35 stealth fighter.

10:18 Does that all make sense? Does that work?

10:18 No. It doesn't. That's not right. It's not right because in the patent law we have this thing called a bargain. The bargain is you tell -- inventor tells the public, all of us, here's what my invention is in 1998, 1999. Here's what it is. I'm going to write it down.

10:18 Those fence posts have to stick because I don't get to move them over time to see the good stuff that came out after me and claim that I invented that. I don't get to claim other people's work.

10:18 If I invented a toy airplane of balsa

10:18 wood with a rubber band, I get that. I don't get the
10:18 stealth fighter. It has to stay put, okay? That's the
10:18 bargain. That's the handshake.

10:19 And in exchange for disclosing that, for
10:19 nailing your fence posts down, what do you get in
10:19 return? Patent rights.

10:19 Now, if you can break that bargain and
10:19 you come in later and you say, I invented the stealth
10:19 fighter, here's the deal. You have broken the bargain.
10:19 At the very foundation of the patent system, you've
10:19 broken it. Split the foundation.

10:19 And that is why when someone does that,
10:19 their patent is held invalid. That's why. They broke
10:19 the bargain.

10:19 And that is what should happen in this
10:19 case because Dr. Chu is claiming work that he didn't
10:19 do.

10:19 Why's he doing that? Why would he do
10:19 that?

10:19 You've already heard it. It's 40 million
10:19 reasons. It's money. Y'all heard the saying: The
10:20 love of money is what? It's the root of all kinds of
10:20 problems, okay?

10:20 That's what it's about. That's why he's
10:20 doing this.

10:20 On that point, Mr. Newell, Mike Newell, could you stand up?

10:20 Mr. Newell's going to be our last witness. The point of his testimony will be that the credit that Dr. Chu is seeking in this case is not remotely real world. It's a bunch of hooey, okay?

10:20 They're going to talk about all these licenses, and what they're implying to you is because other people have settled, that ASUSTeK has to also, okay?

10:20 That's the little secret. All these, they've paid us for our technology. They lined up because we had such an awesome XP Bus that didn't work. No. No. No. Dr. Chu has sued everyone under the sun in the computer industry. Dr. Chu has gotten people to settle to get out of their lawsuits. That's it.

10:21 Does that mean that ASUSTeK doesn't get to raise their paddle and defend themselves when they choose to do so?

10:21 No. That's their right. It doesn't matter if other companies choose to settle.

10:21 At the end of this week, I'm going to come back up and ask you that commonsense question again. Remember, we only get credit for the work that we actually do. And I'm going to ask you guys to give

credit where the credit is due.

Mr. Bhatt, he did the work. ASUSTeK, the rest of the computer industry, they did the work. They get the credit.

I'm going to ask you to give Dr. Chu the credit that he is due also, and that's zero. That's nothing. He didn't do the work he's claiming.

I really do appreciate your attention. There will be some slogs as we go through this case. There will be some technical information. Bear with it, okay? You'll get there in the end.

But I do appreciate your attention, and thank you very much for your time.

THE COURT: Counsel, you may call your first witness.

MR. COLLARD: Thank you, Your Honor.

We call Dr. Bill Chu.

Your Honor, we have a couple of physical items that I'm going to move up to the witness stand if that's okay.

THE COURT: Sure.

(The witness was sworn.)

MR. COLLARD: Your Honor, I want to be sensitive, if you're thinking of a morning break, do you want me to look for a spot in a certain period of

time to take a break?

THE COURT: Why don't we -- yeah. Why don't you go ahead and get started, and then I'll find a place to break?

Thank you.

MR. COLLARD: Thank you, Your Honor.

DIRECT EXAMINATION

BY MR. COLLARD:

Q. Good morning, Dr. Chu.

A. Good morning.

Q. Can you please state your full name for the jury?

A. My name is William Wing Yen Chu. Wing spells W-i-n-g. Yen spells Y-e-n.

Q. So let's just make sure you're speaking into the microphone. Let's move it up a little bit, I think, and then maybe you can scoot right up to it.

A. I have a soft voice.

Q. Can you say your name again just so we can test the --

A. It's William Wing Yen Chu. Wing spells W-i-n-g. Yen spells Y-e-n.

MR. COLLARD: Kristie, are we doing okay?

BY MR. COLLARD:

Q. Okay. That middle name, is that a Chinese

name, sir?

A. Yes, sir.

Q. Does it have a meaning in English?

A. Yes. It does. It means "forever kind."

Q. Thank you, Dr. Chu.

Where do you currently live?

A. I live in Los Altos, California, in the Silicon Valley.

Q. And how long have you lived in Silicon Valley, sir?

A. Probably over 50 years.

Q. And are you married?

A. Yes.

Q. What's your wife's name?

A. Teresa Chu.

Q. And where did you meet Teresa?

A. I met her at University of California Berkeley.

Q. What was she studying when you met her at the University of California Berkeley?

A. She was getting a business degree.

Q. And so does she have any university degrees?

A. Yeah. She got her business degree from UC Berkeley, and then she got an MBA from University of Illinois Urbana.

10:25 Q. And what does she do today, your wife, Teresa Chu?

10:25 A. She work for ACQIS in handling the accounting and finance.

10:26 Q. And is she also a part owner of ACQIS?

10:26 A. Yes.

10:26 Q. And then I recall you and Teresa have two kids; is that right?

10:26 A. Two daughters, yes.

10:26 Q. And is it Tiffany and Amanda?

10:26 A. Yes.

10:26 Q. What does Tiffany do for a living, Dr. Chu?

10:26 A. My older daughter Tiffany lives in San Francisco. She is a finance director at a company, and the company provides free financial advice to consumers.

10:26 Q. And what about Amanda, what does Amanda do for a living?

10:26 A. Amanda is my younger daughter. She lives in New York. She is an OB/GYN surgeon, and she helps patients that suffer from very severe endometriosis.

10:26 Q. Thank you, Dr. Chu. I appreciate you sharing about your family. And I'd like to talk a little bit about your personal background.

10:26 Where were you born?

A. I was born in Shanghai, China.
Q. And did you grow up there?
A. No.
Q. Where did you grow up?
A. We fled -- the family fled communism. I left China when I was four years old and went to Hong Kong.
Q. Hong Kong.
Can you explain to the jury, why did it help at that time to move to Hong Kong, which is now a part of China?
A. Well, at the time when I was there, Hong Kong was a British colony. So of course, it's not a communist place and...
Q. Did you become a British citizen when you moved to Hong Kong?
A. No. I was subject to a colony, so I'm not a citizen.
Q. What schools did you attend as a boy in Hong Kong?
A. I attended a Jesuit high school, Wah Yan, for my high school. Yes.
Q. All right. And did you have brothers and sisters?
A. Yes. I do.
Q. All right.

10:28 MR. COLLARD: Let's take a look at Demonstrative Exhibit PDX-2.1.

BY MR. COLLARD:

10:28 Q. Is this a picture of your family, Dr. Chu?

10:28 A. Yes. Long time ago.

10:28 Q. All right. Which one are you?

10:28 A. I'm the chubby one in the middle.

10:28 Q. And then for your siblings in this picture, can you briefly tell the jury their names and what they do and perhaps where they live?

10:28 A. On my left is my older brother Tom. He lives in the Los Angeles area. He was -- he was a pharmacist. And my younger brother David, he lives in Hong Kong. He was a Baptist priest. And my sister Carrie, she lives in New York, and she is in real estate.

10:28 Q. Okay. Thank you, Dr. Chu.

10:28 When you were a boy, did you have dreams about moving to the United States?

10:29 A. Yes. I did.

10:29 Q. Why?

10:29 A. I love science and engineering, and U.S. has the best university for science and engineering.

10:29 Q. And when did you come to the United States?

10:29 A. I came in September of 1969.

10:29 Q. And how old were you then?
10:29 A. 18.
10:29 Q. And how'd you feel when you came to the U.S.?
10:29 A. Of course this was exciting. The environment is completely different, and I was pretty eager to learn.
10:29 Q. Now, your older brother Tom, was he already in the United States at that time?
10:29 A. He was.
10:29 Q. All right.
10:29 MR. COLLARD: Let's look at PDX-2.2.
BY MR. COLLARD:
10:30 Q. And I want to talk about this picture, so we'll wait for it to come up. There we go.
10:30 Oh, there we go.
10:30 Can you tell us about -- tell the jury about this picture, please.
10:30 A. I took this picture with my older brother Tom at the Santa Clara University. It's very close to the cannery that we worked at in the summer.
10:30 Q. So you worked at a cannery?
10:30 A. Yes. I did.
10:30 Q. How long did you work at this cannery?
10:30 A. I worked for three summers.
10:30 Q. Can you briefly describe for the jury what it

was like working in a cannery during the summers?

A. Well, it was boring. It's hard labor. And I was unclogging sorting machines for peaches, and also I took buckets of bad peaches to the dumpster.

Q. Okay. So in the -- in the fall of 1969 -- do I have my timing right? And is that when you entered the four-year undergraduate program in electrical engineering?

A. At UC Berkeley. Yes.

Q. Okay. And so what was it like for you starting college at the University of California Berkeley? In that -- is that in Oakland?

A. No. It's in Berkeley.

Q. In Berkeley.

A. Close to Oakland.

Q. Close to Oakland.

And in 1969, what was that like?

A. When I went to the school, to the university, there was riots there at the time. So I stay in my room and study. So there's a lot to learn.

Q. And what is the focus of your study?

A. Undergrad is fairly general. You have liberal arts stuff, and you have science, of course, physics -- there's physics, mathematics, and stuff. And of course, I was electrical engineering. A lot of

electrical engineering courses.

Q. Can you describe just a little more for the jury what you're studying really when you're studying electrical engineering?

A. Pretty much everything. You study the -- how they are made -- how transistors are made, how they function in circuits, how you design circuits.

Q. Computers? Are you studying how computers work?

A. Sure. Of course. Yes. Uh-huh.

Q. And did you continue to work all the way through your undergraduate education?

A. Yes. I worked at the cannery for three summers. I needed money. And I also worked at a co-op to save money too.

Q. And how long did it take you to get your bachelor's degree?

A. I got my bachelor in three years.

Q. And how did you finish this four-year program in only three years?

A. Well, when you don't have money, I have to take more courses. So I want to save money to finish the four year in three years.

Q. Okay. What did you do after you graduated, Dr. Chu?

A. I continue to the master program at Berkeley.
Q. And what did you study in your master's program at Berkeley?
A. Integrated circuits.
Q. Can you tell the jury, what is an integrated circuit?
A. It's what I said, that you take a large number of transistors and design it and put it on a piece of silicon for computer use.
Q. And how did you pay for graduate school?
A. I was a teaching assistant, and also I got a scholarship.
Q. Who -- let's talk about the teaching assistant part.
Who were you teaching?
A. Undergraduate students.
Q. Undergrad students at Berkeley?
A. Yes. Uh-huh.
Q. And then was that scholarship based on merit?
A. Yes.
Q. And did you receive a master's degree at the end of that program?
A. Yeah, in two years.
Q. And did you immediately after that continue on to pursue your doctorate?

10:34 A. Yes. Yes. I did.
10:34 Q. And where did you do your doctoral research?
10:34 A. UC Berkeley has a fairly unique program. They partner with the industry to -- for certain doctorate degrees, and I joined that program. So I went to Bell Labs in New Jersey to do my research.
10:34 Q. Can you tell the jury a little bit about Bell Labs, please, and what that is?
10:34 A. At the time it was a really renowned research lab, very large one, that was -- basically belongs to the Bell Telephone systems.
10:34 Q. And was it exciting to be able to do research there at Bell Labs?
10:35 A. Yeah. It was fun.
10:35 Q. Can you briefly describe the type of research that you did while you were at Bell Labs?
10:35 A. I was designing and building a special device. It's called high voltage DMOS driver circuit for plasma panels.
10:35 Q. Did that research have any applicability in the future?
10:35 A. It actually was commercialized, and it became like plasma TVs and displays.
10:35 MR. COLLARD: Let's take a look at PDX-2.3, please.

Thank you.

BY MR. COLLARD:

Q. What is in this picture?

A. My advisor, I guess, awarded me my doctorate degree.

Q. This is you getting your doctorate?

A. Yes.

Q. How old were you here?

A. I think I was 25.

Q. 25. Thank you.

So you mentioned you were not a British citizen when you grew up in Hong Kong.

Were you a citizen of any country?

A. No. I was not.

Q. Did you want to become a citizen of the United States?

A. Yes. Very much.

Q. Why?

A. Well, many reasons. I mean, I -- I obviously believe in democracy. I know in this country, you have freedom. You have justice. Justice to protect yourself. So -- and I didn't belong anywhere, so I want to belong here.

Q. Did that happen? Did you become a U.S. citizen?

10:36 A. Yes. I did.
10:36 Q. Approximately when did that happen, Dr. Chu?
10:36 A. I think it's 1984.
10:36 Q. Could you briefly share with us what you remember about the day you finally became a U.S. citizen in 1984?
10:36 A. Well, as I said, I finally belong somewhere, and it's a wonderful place to build my family. I already started my first company at the time. I started my first company in 1982. So this would be a wonderful place for me to build my business and career.
10:37 Q. Dr. Chu, we're actually going to get into your work history here in a second, but before I do that, how do you spend your time today?
10:37 A. I spend my time between ACQIS and my nonprofit.
10:37 Q. And what is your nonprofit?
10:37 A. The name of my nonprofit is called Hearts to Humanity Eternal. Our mission is to build a lasting community of scientists and engineers who cares about humanity and who do research to advance humanity.
10:37 Q. And who does your nonprofit support?
10:37 A. We provide research grants to UC Berkeley, mostly graduate students, and we support a large number of community activities among these student

researchers.

Q. Thank you, Dr. Chu.

Now, I do want to turn and talk a little bit about your work history, and we'll just kind of focus on some key jobs in your work history. Okay?

A. Okay.

Q. The first one is -- I want to talk about is Verticom.

What is Verticom?

A. It's the first company I founded in 1982.

Q. And what did that company do?

A. We provided graphics products for the computer-aided design market.

Q. And were you also VP of engineering at Verticom?

A. Yes. I was.

Q. Did Verticom go public?

A. It went public in 1986.

Q. And can you explain to the jury just briefly what it means to go public?

A. We were listed on NASDAQ so that we can raise funds from the public.

Q. Is being listed on the NASDAQ Stock Exchange and going public, is that a marker of success for a company?

A. Yes. I guess so. I guess.
Q. And what happened to Verticom?
A. We were acquired two years later by a company called Western Digital.
Q. When that happened, did you also join Western Digital?
A. Yes.
Q. And what was your position?
A. I was VP of engineering for the whole graphics division.
Q. Okay. And was Western Digital, at that time, was it a large company?
A. It was a Fortune 500 company. Yes.
Q. And what type of products did Western Digital offer?
A. They built all kinds of computer products in the storage area, in communication, in audio, and in my division, the graphics products.
Q. You talked about your division.
Did you manage a team while you were at Western Digital?
A. Yes.
Q. How many -- how big was your team?
A. My team, I had about 150 engineers.
Q. Okay. And what -- what was your role as

manager of those engineers?

A. Well, of course I have to manage the teams. I decided what product to build, and I talked to customers.

Q. And were any of the products that you oversaw during your time at Western Digital, were any of those successful?

A. Yeah. We had two products in particular. We launched the first Microsoft Window -- we call it accelerated chip, graphics chip, so that we can take full advantage of speed for Microsoft Window. That's in the desktop chip area.

And we were the first one to launch in the laptop product a chip that integrated back an analog circuitry into the same chip. Doesn't sound like too much, but nobody was able to do that and we were able to do that.

Q. Did you leave Western Digital?

A. Yes.

Q. And where did you go next?

A. I went to company called AcuMOS.

Q. And what type of job did you do at AcuMOS?

A. I was also the VP of engineering.

Q. And then was AcuMOS acquired by another company?

10:40 A. It was acquired by Cirrus Logic.
10:41 Q. And did you go to work for Cirrus Logic?
10:41 A. Yes. I did.
10:41 Q. Is Cirrus Logic a large company?
10:41 A. Not as large as Western Digital, but was quite large. It's hundreds of millions of dollars in revenue. Yeah.
10:41 Q. Okay. And what was your role at Cirrus Logic?
10:41 A. I was the general manager for the desktop graphics division.
10:41 Q. And so how many people were you managing at Cirrus Logic?
10:41 A. At the peak, I had actually about 300 engineers.
10:41 Q. And what kind of work were you doing there?
10:41 A. Same work, managing the teams, deciding what product to build, and also talking to customers.
10:41 Q. So I want to dig into a little more about your work at Cirrus Logic in the 1990s.
10:41 THE COURT: This seems like a good transition.
10:41 Ladies and gentlemen of the jury, we're going to take our morning recess. We'll take a recess in the morning and a recess in the afternoon, and of course we'll get a lunch break.

10:42 I'll have a couple of instructions for you while we are not together and while you're with the other jurors or when you go home.

10:42 First is: You are not permitted to talk about anything you've heard during the case until the end of the trial when you begin your deliberations.

10:42 So I've never served on a jury. I don't know what it is y'all talk about back there. You're welcome -- one of the jurors has a nice cowboy hat. You're obviously -- that's fair game or anything else, but please don't talk about anything during the trial.

10:42 Second is: Please, if you are on social media, whatever that is, I don't -- I'm not, but please don't post anything about the trial while you are serving as a juror.

10:42 And finally, please do not do any independent research about anything that might happen during the trial. The lawyers have worked very hard to prepare the case and to present the evidence that they intend to have you consider. Please don't do any additional research about the parties or the lawyers or anything else.

10:43 Going forward I'll just say, please remember my instructions. Those are the instructions. So we'll be in recess for 10 or 15 minutes.

THE BAILIFF: All rise.

(Jury exited the courtroom.)

THE COURT: You may step down, sir.

You may be seated.

Is there anything we need to take up?

MR. COLLARD: Very briefly, Your Honor.

I'm concerned that the opening statement, and this may come up again, is -- violated Motion in Limine No. 7. I, of course, didn't want to object during the statement.

But argument suggesting there's anything legally improper in filing a patent application or writing patent claims to cover an adverse party's product was said explicitly by Mr. Buresh. My notes were that: You don't get to look back at their work and claim that.

And that is exactly what's prohibited by Motion in Limine No. 7.

THE COURT: Counsel?

MR. BURESH: Your Honor, we're making a written description and enablement defense. All my argument was going toward is the notion that you can't move the fence post as you move forward.

THE COURT: Well, I think you need to be more careful. I agree with counsel that you should not

10:44 be intimating anything that indicates that -- for example, that he, during the prosecution process, did anything improper by -- anything improper. I'll limit it to that, whatever that might be.

10:45 And so I don't know that that statement does much to support your defenses, and so I would be more careful going forward.

10:45 MR. BURESH: Understood, Your Honor.

10:45 THE COURT: Anything else?

10:45 MR. COLLARD: That was all, Your Honor. Thank you.

10:45 THE COURT: Who comes after -- what witness will be next?

10:45 MR. COLLARD: It's our infringement expert, Dr. Sarhan.

10:45 THE COURT: Okay. So we'll go from him -- and -- so I have a phone call I have to take at 1:00. My plan is to go a little bit past noon, and then break when we break. And we'll see when we get to about that time, what we may do is just have you introduce your expert, prove him up, and then break at that point. But we'll figure it out.

10:45 How --

10:45 MR. COLLARD: I'm sorry. I'm going to really try to get done with Dr. Chu before lunch, a

little after noon, but I'm not sure --

THE COURT: Oh, no. I thought you were going to get done. So if he's going to go through noon, we'll -- if it helps you, we'll go till maybe 12:30 then.

MR. COLLARD: Okay.

THE COURT: And not -- I'm not pushing you. I don't care how he's presented. I just want to make sure that the jury isn't sitting around too long waiting for us.

And if I haven't told you all, I know you all's -- the folks you've hired who are from here I'm sure have told you this, but to make clear if you don't know, as long as a witness is on direct, you may speak to the witness.

Once the witness is on cross, then you may not with one exception per side or I think maybe two on the defense side per side, which is: You have your client; they have the two clients. And I don't know if your two clients are going to be testifying or not. So doesn't matter --

MR. BURESH: They will be, Your Honor.

THE COURT: They will be? Both?

Okay. So regardless of when they are testifying, you can still talk to them. Otherwise, the

rule about direct and cross applies.

So anything else?

MR. COLLARD: Nothing from us, Your Honor.

THE COURT: Okay.

(Recess taken.)

THE BAILIFF: All rise.

THE COURT: Please remain standing for the jury.

MR. COLLARD: Your Honor, I have a brief issue, very brief, before we bring the jury in. I'm sorry.

THE COURT: Yes, sir.

MR. COLLARD: You said that you would pay attention to and revisit potentially the paragraph that we had to redact out of the notice letter on the IBM litigation.

THE COURT: Yes.

MR. COLLARD: In my notes from the opening, it was Mr. Buresh saying that: Dr. Chu sued everyone under the sun.

It seems like if he can say that, that I shouldn't have to take out the --

THE COURT: No. No. I'm not going to -- I -- it's very -- it's a very high hill for you to

climb to allow any other lawsuit in here.

MR. COLLARD: Understood.

THE COURT: So I'm not going to permit that.

MR. COLLARD: That's all. Thank you, sir.

(Jury entered the courtroom.)

THE COURT: Thank you. You may be seated.

Counsel, you may continue, please.

MR. COLLARD: Thank you, Your Honor.

BY MR. COLLARD:

Q. Dr. Chu, to kind of put everybody back on the timeline, we have been talking about your work history. We were talking about your work at Cirrus in the 1990s, and I want to dig in a little more into your work that you were -- what you were doing at Cirrus in the 1990s.

Is that okay?

A. Yes.

Q. Great.

Was the increasing speeds of computers something that you had to monitor while you were working at Cirrus?

A. Yes.

Q. Why?

11:01 A. Computer rate is getting faster every year, because that's what consumer wants, and companies dealing with faster processor after each generation. So the graphics device has to keep up with that.

11:02 Q. So was part of your job at Cirrus making sure that the products that Cirrus was making would keep up as computers get faster?

11:02 A. Yes. The graphics chip that we built has to interface to the processor. So as that interface gets faster, we have to get faster.

11:02 Q. And can you explain to the jury sort of why are computers always getting faster?

11:02 A. Very few people want to buy slow computer, so everybody wants to buy faster computer. And Intel every year comes out with faster computers and faster logic. So we have to keep up.

11:02 Q. Is that the processor?

11:02 A. The processor is the brain of the computer.

11:03 Q. Okay. And are there other parts inside of the computer that communicate with that processor, that brain?

11:03 A. Yeah. You will have the brain, and you will have, you know, memory. You will have storage devices. You will have audio, communication devices, of course graphics, audio device, all surrounding the processor.

Q. Okay. Now, how are those devices, those components that you just mentioned, what connects them to the processor?

A. Through a computer bus.

Q. Computer bus. Great.

Now, this is where I'm hoping you can help the jury start to understand this.

What is a computer bus?

A. Kind of briefly mentioned that. It's basically wires on the circuit board mostly, and you will have what we call interface drivers on each side. They're pretty much controllers that control the flow of information between the devices.

Q. Thank you, Dr. Chu.

And I just want to ask this one too: Is a computer bus, is it inside the computer or outside the computer?

A. There are buses inside, but there are also buses that goes to connectors in a computer, like USB, so you will go to external components. Both types are out there.

Q. Both types. Thank you.

Do you have a comparison that can help us think about a computer bus?

A. Yes. Kind of. But you are -- computer bus is

like roads depending on the arrangement. It could -- that could connect the people between buildings and things.

Q. Okay. And were there different types of computer buses that were being used around this time?

And on the timeline, we're still in the 1990s.

So were there different types of computer buses being used around then?

A. Quite a few. Yes. Uh-huh.

Q. What is PCI?

A. PCI stands for Peripheral Component Interconnect. It's a type of bus that the -- the graphics device also interface to but also other devices. It's one of the main primary bus for communicating the internal peripheral device to the processor.

Q. And what about USB? Was that one of the buses that was being used in the 1990s?

A. At the time of my invention, it was a very slow bus. People probably use it for maybe keyboard and mouse. Not too much.

Q. Okay. We mentioned two specific types, and we don't have to go into all the other types, but I want to know, were there other types of buses that were being used in the 1990s?

11:05 A. Yeah. There was some more advanced buses. We call it 3094 or there's some ISA bus. So it's -- there are quite a few. Yes.

11:06 Q. Okay. So we're talking about computer buses now.

11:06 Does the computer bus have to improve to keep up with faster processors?

11:06 A. Yes. You have to.

11:06 Q. What if it doesn't?

11:06 A. Well, if it doesn't, then you will -- the information cannot flow. If the processor runs faster, it can process more information. So you need to talk to the rest of the system. So you'll get -- you know, like in the intersection, you get roadblocks, and then a computer basically cannot do anything. So you will not be able to fully take advantage of the speed of the processor.

11:06 Q. Thank you, Dr. Chu.

11:06 Now, we'll go a little bit back into your work history.

11:06 You decided to leave Cirrus Logic when?

11:06 A. Around November of 1997.

11:06 Q. Why did you decide to leave Cirrus?

11:06 A. Cirrus decided to get out of the graphics business.

11:07 Q. Was its graphics business doing poorly?
11:07 A. Not at that time.
11:07 Q. Then why did Cirrus decide to get out of the graphics business?
11:07 A. Intel is a monopoly on most with the processor, and they also control what we call the "system logic." The system logic, we can only at the time mostly buy from Intel. So they decided to take the graphics device and put it inside the system logic.
11:07 So when you do that, you basically cannot compete in that business. So it is not -- wasn't my decision to -- Cirrus Logic said, you know, we can't compete in this situation, so we have to get off of the business.
11:07 Q. Thank you, Dr. Chu.
11:07 So after you left Cirrus in late 1997, what did you do professionally?
11:07 A. I took a small break. My mother was here in U.S. to treat her cancer, so I took a break. And after that, around Christmas of 1997, I decided to start working on my invention.
11:08 Q. Okay. And are you referring to the inventions that ultimately, somewhere down the road, are in the patents that were awarded to you by the U.S. Patent Office?

A. Yes.

Q. Okay. So we'll come back to the patents, but I want to be clear on the timing.

When was this that you started work on your inventions?

A. Well, I started around Christmas 1997.

Q. And what was -- can you tell the jury a little bit about what computing and computers were like back in the very end of 1997 and the beginning of 1998?

A. At the time I saw the problem in that computers were large and not very portable. The laptop in those days weighed about 6 pounds. And so I was trying to solve a problem to help consumer deal with mobile -- to get that more mobility of the computer.

Q. Were computers in 1998 as fast as they are now?

A. No. Of course not.

Q. Okay. Were they as portable as they are now?

A. No. They were not.

Q. Were computers -- what was the Internet like in 1998?

A. If you're lucky to get one; otherwise, you don't have it. It's slow.

Q. So let's talk about your work on the inventions.

11:09 MR. COLLARD: Move to admit J-22, J-23, and J-24, which are the white papers.

11:09 MR. BURESH: No objection.

11:09 THE COURT: Admitted.

11:09 BY MR. COLLARD:

11:09 Q. Did you make a record of your inventions that you worked on around that time?

11:09 A. Yes. I sat down and really dedicate all my time to detail -- to do a detail description of my invention. I wrote basically three white papers to do that.

11:10 Q. So what are white papers?

11:10 A. It just -- it's the way that you have a detailed documentation of something. We just call it "white paper."

11:10 Q. Okay. And when did you write these white papers?

11:10 A. Between Christmas of 1997 to about middle of January of 1998.

11:10 Q. All right. And we're going to look at them more closely here in a minute, but before we do that, can you please name how you see the invention or inventions in these white papers?

11:10 A. There were two key inventions. There -- we talked about the modular computer invention. At the

time I thought it was, you know, very unique. But in order to implement that, I have to create a new computer bus.

Q. So were those the two inventions, the new modular computer and a new computer bus?

A. Yeah. Those were the primary invention. Correct.

Q. Let's take it one at a time.

Can you please explain to the jury the modular computer systems that you described in your white papers?

A. This was a long time ago, 24 years ago. We -- we tried to put everything that's important in the -- for computer, the processor, the storage, the memory, the graphics, the communication device, all in a single box that's really small. This weighs about a pound in those days. And so --

Q. Thank you, Dr. Chu. We're going to come back, and we'll actually look at those quite a bit.

A. Okay.

Q. But for now, I want to stick to the white papers.

And so what sort of problems did you hope to solve with a new modular computer system?

A. Two problems. One was to -- as I said, to

build the actual modular computer to help consumer having a more affordable system. The -- in order to implement this computer system --

Q. Well, hold on. Let's do this one at a time.

So now I do want to talk about the computer bus.

Why did you invent a new computer bus in these white papers?

A. To build a computer module for multiple generations. The interconnect between the computer and the consoles really cannot change. So we want -- I wanted to build what I call a universal bus. I want to build a universal bus that when the inside of the computer, as we said, gets faster and faster, as we all know it will happen, we don't have to change that bus. We'll be able to send the data for a current generation of bus or to later generation of bus, go through this high-speed universal bus so that the system will be future-proof.

Q. Okay. So do all three of the white papers describe parts of the new bus that you were designing?

A. Yes.

Q. Great.

MR. COLLARD: Let's look at the front cover of J-22. And let's blow up the title in the top

11:13 bit, please.

BY MR. COLLARD:

11:13 Q. And what is this document?

11:13 A. It was my first white paper talking mostly about the modular computer console.

11:13 Q. All right. And I want to look in this white paper -- oh. And sorry. I just want to point out -- is this -- up here on the top left, is that the date that you finished this -- drafting this white paper?

11:13 A. Yes. That's the day I finish.

11:13 Q. Okay.

11:13 MR. COLLARD: And let's look at Page 15 of this document. It's Figure 5.

11:13 And we'll blow up the image here, please.

11:13 Thank you.

11:13 BY MR. COLLARD:

11:13 Q. What does this show, Dr. Chu?

11:13 A. So I talked earlier about I want to build a universal bus that's high performance. I named that the XP Bus. So I mentioned earlier that I wanted that bus not to change regardless of what's happening with the PC technology at the time.

11:14 So there are many types of peripheral bus. I name here the PCI bus, the USB bus. ACLink is also a bus. LPC was also a bus. 1394 is potentially also a

bus.

Q. Thank you, Dr. Chu.

And what technology did you suggest to create or implement your new computer bus at a high level?

A. I use a existing technology that was fairly new at the time. It's called a "low voltage differential signal" technology. It's short for LVDS. I chose to use that technology.

Q. Let's look at that. Let's look at a different white paper. It's J-23. And let's just look at the cover first before we -- and get the date on this.

So the title of this is Two separate PCI or PCI-like Busses Bridged by a pair of Interface Devices through a High Speed Bus.

And is this date in the corner, January 15th, 1998, is that the date that you finished drafting this?

A. Yes. It was.

Q. Okay. So I want to now go to Page 5 of this document, and we're going to look at Paragraph 1, Summary of the invention.

MR. COLLARD: And I want to call out the last line, please.

BY MR. COLLARD:

Q. Is this one of the places in your white paper where you describe the technology of the new bus?

A. Yes. As I mentioned earlier, I use a new technology here at the time called LVDS, differential signal pair, to use as the connection for my bus.

Q. So let's start talking about the LVDS technology.

Can we start with the LV? What does that stand for?

A. It stands for low voltage.

Q. Okay. And why is low voltage -- I'm sorry.

Was having low voltage important to the design of your computer bus?

A. It was very important.

Q. Can you --

A. In 1998, the typical bus, like PCI bus was using 3 volt to 5 volt for signal. The signal that I can use with this LVDS technology was around .4 volts. So when you consider the speed of the signal, if you have to charge a wire up to 3 volts or 5 volts, it takes a much longer time. So with .4 volt, you spend much less time bring the signal up. So it's much faster.

Q. So it was much faster.

Did it have any changes in how much power was used by the bus?

A. A huge amount, because power is calculated by

the square of the voltage. So if it's 5 volts, if you square, it's 25 -- it's put at the 25 unit. But when you square a .4-volt signal, it's only .16. So you're talking about almost 100 times reduction in power.

Q. Thank you, Dr. Chu.

What about -- let's talk about the DS part, that differential signal.

Was it important to use a -- was it important to you to use a differential signal in your new computer bus design?

A. Very important.

Q. Why?

A. When you lower a voltage to .4 volts, all the surrounding noise, sometimes they can get to be, you know, a volt. So you will obscure the signal if you don't do something about it --

Q. Wait. Before you go on, Dr. Chu -- I'm sorry -- can you explain to the jury, please, what you mean when you say "noise"?

A. Noise is -- any circuit that moves in your computer generates electrical emission. So it's kind of interference that you cannot stop because it comes from every circuit. So that's electrical interference that can affect your integrity of your signal.

Q. So can you explain to the jury how using a

11:18 differential signal helps with the problem of common noise in the computer?

11:18 A. Yes. You send a signal down two wires instead of one, and the way we can arrange it is such that you will cancel out all the noise in that surrounding so that your .4 volt will be able to be sent over those wires.

11:19 Q. Was it common to use LVDS in a computer bus when you had the idea and wrote it down in your white papers?

11:19 A. That was my primary invention because nobody else was using LVDS for computer bus at that time.

11:19 Q. So in addition to being LVDS, was there another attribute of the type of channel that was important and written down in your white papers?

11:19 A. Well, to gain high performance further, I use this concept of, you know, dedicated lane so you can send --

11:19 Q. Let's look in your white paper at it.

11:19 Is it the unidirectional part, Dr. Chu, when you say a "dedicated lane"?

11:19 A. Yes. Unidirectional is the technical term basically.

11:19 Q. All right. We'll take it one piece at a time here.

11:19 MR. COLLARD: We'll go to Page 5 -- oh, we're on Page 5. Sorry. We'll go to the third paragraph, please.

11:20 And then it's the very middle of this paragraph, towards the right side.

BY MR. COLLARD:

11:20 Q. It says: LVDS data transmission is only in one direction at a time.

11:20 Is that what you were referring to about dedicated lanes?

11:20 A. Yes.

11:20 Q. Was this a key attribute of your new computer bus?

11:20 A. Yes. It gives you faster performance.

11:20 Q. Can you explain how it gives -- it provides -- how sending data in one direction at a time provides faster performance?

11:20 A. Well, we use the analogy before. The old bus was like an intersection -- a road intersection where you have four-way traffic. So you have a signal light, so they have to wait for the lane -- the channel to be free before you can cross.

11:20 So by using this one direction at a time, it's a bit like highway. You don't have to wait. You basically can have data going north and south at the

same time.

Q. Thank you, Dr. Chu.

I want you to talk a little bit -- well, let me just ask it this way: Was the bus that you designed -- the new bus that you designed in the white papers, did you have it -- did you design a serial bus or a parallel bus?

A. Serial bus.

Q. What was the old bus design?

A. It was a parallel bus.

Q. Can you please describe for the jury how data moves on a parallel bus or in parallel transmission?

A. The old bus has a large number of pins, so datas get sent across at the same time. And in serial bus, you have much fewer wires, sometimes down to just two wires. So you can go -- two pairs of wires.

You can go basically sequentially. The data goes sequentially. I think you used the term "follow the leader." So it basically goes sequentially in either direction, much fewer wires.

Q. So follow the leader on serial.

And then parallel, is that sort of side by side across many wires at once?

A. Yes.

Q. Thank you.

11:22 And why did you choose a serial design for your bus when at that time the existing bus was a parallel design?

11:22 A. Quite a few reasons. Because the less lines you have, it's an easier design, and it gives you ability to scale it easier. You know, if I end up using 10 lines instead of 50 lines, I can add another line -- another group to improve performance.

11:22 That's kind of -- that came with advantage of using less lines.

11:22 Q. Did it do anything with the connectors? Did it have any impact on connectors?

11:22 A. Yes. You know, it's -- a connector is a big cost, and you want to have the smallest connector possible.

11:22 Q. Thank you.

11:22 So the bus that you created with these attributes, did that mean -- did your bus have a new physical form?

11:23 A. Yes. Uh-huh.

11:23 Q. And then did your computer bus design preserve information so that that would be compatible with existing bus standards?

11:23 A. For us in the hardware industry, it's very important to not affect the software in the system, the

11:23 operating system, and in the peripheral situation where
11:23 you have many, many kinds of peripheral you can put
11:23 into the system -- they are the -- like what we call
11:23 device drivers -- for those to communicate with the
11:23 operating system.
11:23 So you have -- it's impossible for whoever
11:23 doing this to affect so many companies to change your
11:23 software. So the only way you can do it is what we
11:23 call backwards compatible. You build the system, and
11:24 the software people doesn't need to know about it. It
11:24 still works.
11:24 Q. So that's a "yes." It was backwards
11:24 compatible?
11:24 A. Yeah. That's a lengthy yes.
11:24 Q. Yes. Okay.
11:24 And were there any specific standards that you
11:24 wanted to ensure that you remained backwards compatible
11:24 with in your bus design?
11:24 A. It has to because, as I said, otherwise you
11:24 can't sell your computer.
11:24 Q. Can you name any specific standards?
11:24 A. Oh, okay. PCI bus was one of them.
11:24 Q. Yes.
11:24 A. And USB 3.0 -- USB was one of them.
11:24 Q. Okay. And what kind of computer systems did

11:24 you envision using this computer bus in?
11:24 A. It's really all computers.
11:24 I think this may be a misunderstanding that you tie the two inventions together, the modular computer and the computer bus.
11:24 If you think about modular computer, it's really just a form factor. If you plug in your computer into a notebook console, that whole system is a laptop computer. If you plug it into a desktop, the whole system's a desktop computer.
11:25 So the thinking is really that -- think about it like this, the computer bus is no use unless the system is functional. So the only way the computer bus can be valid is that when it's operating within a whole computer.
11:25 So computer bus is not tied to the modular architecture. It's tied to how the whole system works.
11:25 Q. Thank you, Dr. Chu.
11:25 Could you tell the jury what you would think and what you would call the top three, let's say, advantages of your new computer bus over the old bus technology as it existed in that time, 1998?
11:25 A. Well, we talk about high performance. That's essential.
11:25 Q. Does that mean faster?

A. Faster. You have to be.

Lower power. If that doesn't happen, you won't have your phone today. The power is one of the most important thing.

And then, ultimately, it's the sense of backward compatibility, the sense that you want to reduce the number of errors in a system.

Q. Okay. What about space? Was the space one of the key advantages?

A. Space. If your bus takes -- when you build a board, there's so many traces. If you have less of those wires, it's easier to build.

Q. Okay. So we've talked about and looked at some parts of your white papers, and I want to kind of talk about what happened next.

What did you do after you wrote your white papers?

A. I did it specifically to give it to patent attorneys to file the patents.

Q. And did you do that? Did you take your white papers to a patent attorney?

A. Yes.

Q. And did they file patent applications?

A. Yes.

MR. COLLARD: Move to admit J-35 and

P-150, which are two patent applications.

MR. BURESH: No objection, Your Honor.

THE COURT: They'll be admitted.

MR. COLLARD: Let's look at J-35, Page 3. And we'll zoom in on the top bit here.

BY MR. COLLARD:

Q. What is this document, Dr. Chu?

A. It's the first application the lawyers filed for -- on my behalf. So it's filed on May 1st, 1998.

Q. Great.

MR. COLLARD: And then let's do the same for P-150 and look at Page 3.

BY MR. COLLARD:

Q. Same question. What is this document, Dr. Chu?

A. It's a second application filed July 14th, 1998.

Q. Thank you.

I would like to talk about your company ACQIS Technology.

Was it -- well, when did you start ACQIS?

A. July of 1998.

Q. That same month we were just looking at; is that right?

A. Yes.

11:28 Q. Okay.

11:28 MR. COLLARD: And let's look at PDX-2.5.

BY MR. COLLARD:

11:28 Q. Where'd you take this, Dr. Chu?

11:28 A. It was -- I was at a trade show trying to show a mockup of the computer. Actually, that one didn't work, so I was showing the modular function.

11:28 Q. Okay. When -- why did you found ACQIS Technology?

11:28 A. First, I want to build computer systems that's better for consumers, I mean, because they were buying desktop, laptop. And this is alternative way of giving mobility to a user.

11:28 So unfortunately, computer company didn't like the idea because now they get to sell one computer versus two. And Intel didn't like it, they could have sold two CPU versus one. So it didn't -- I was not accepted in the computer industry.

11:29 Q. Dr. Chu, was part of founding ACQIS also to develop your new computer bus?

11:29 A. Well, you have to. When I was developing this, that was something we need to do for future proving the design.

11:29 Q. Great.

11:29 And then how many employees did you have at

ACQIS?

A. At the peak, we maybe have nine engine- -- nine employees, not engineers. Sorry.

Q. How many engineers then?

A. Maybe five.

Q. Is that a smaller engineering team than you were used to working with at your prior jobs?

A. Yes. That's all I can afford at the time, and I used to work with tens of engineers on our chips.

Q. Tens of engineers?

A. Yes.

Q. Okay. And why name the company ACQIS?

A. It actually is -- it's an acronym for Access to Quality Information System.

Q. So can you describe during the time -- at your time at ACQIS or the time when ACQIS was doing this work, what were the ACQIS engineering efforts focused on?

A. Well, we -- you know, it was an ambitious plan. I mean, we were building whole computer system and the chips -- a special chip for doing the serial interface.

Q. So let's take those one at a time.

You had one team working on a chip and one team working on the modular computer system?

A. Yeah. We have two and a half engineer on the chip and two and a half engineer on the system.

Q. Great. Okay. Let's talk about the chip first.

What was that -- what was their goal?

A. Their goal is to build what I have described in my white paper and the subsequent patent to take the PCI bus, which is a parallel bus, and convert it to -- onto the high-speed serial channel that we were --

Q. Okay. And when you say that one team was working on the modular computer, what was -- what was their goal?

A. The modular computer is what you kind of see here because it takes a lot of work to build a new computer system, enclosures, circuits, everything.

Q. All right. And while we're on the topic, I just want to ask you: What's the relationship between ACQIS Technology and ACQIS LLC?

A. ACQIS LLC is a wholly-owned subsidiary of ACQIS Technology.

Q. So at this time, was ACQIS also filing additional patent applications?

A. Yes.

Q. All right.

MR. COLLARD: Move to admit D-25, which

11:31 is the May '99 application.

11:31 MR. BURESH: No objection.

11:31 THE COURT: Admitted.

11:31 MR. COLLARD: And then let's look at 11:31 Exhibit D-25, please. And we can get the top part that 11:31 has that date.

BY MR. COLLARD:

11:31 Q. What is the -- what is this document, Dr. Chu?

11:32 A. At some later point, I realized that when you 11:32 have this -- almost a computer blank, then you can put 11:32 a whole array of them together into a server. So I 11:32 filed this early provisional to kind of capture that 11:32 idea.

11:32 Q. Great.

11:32 Did -- around this time, did ACQIS 11:32 encounter -- and where are we here, around the year 11:32 2000?

11:32 A. Well, at this time was in 2000. Yes.

11:32 Q. Okay. So around the year 2000, did ACQIS 11:32 encounter some funding trouble?

11:32 A. Yes. It -- actually, it was very difficult 11:32 for me to find funding. I got my money from my family, 11:32 my relatives, my friends, and some individual 11:32 investors. And the reason is because the big companies 11:32 won't adopt this concept. So I ran into a fairly tight

funding situation.

Q. And what happened at that time with respect to the development of the computer system and the chip that would use the serial bus?

A. The -- we got the chip back from Taiwan, our manufacturing company. So unfortunately, the first chip did not work.

Q. And did you have any experience in your work with the first chip -- when you're designing your chip with first version not working?

A. Yeah. That does happen. First chip doesn't work, then you try to find a problem and go through another -- what we call "tapeout." So you go to the second chip, and sometimes you have to go to third time.

Q. And is that something you had experience with in your prior roles at Cirrus or Western Digital or Verticom?

A. Yeah. You're going with big teams. That can happen. Yes.

Q. Did you have a big team on this project?

A. A very small team.

Q. Okay. What about the computer system? Did you complete a first generation of the modular computer system?

A. We did. That included the chip in it because that was what we were trying to build.

Q. The first generation did have the chip with the serial?

A. Yes. The first generation is merely the first planned product that we're building. That includes the chip on this system, but when the chip didn't work, what we have to do is we basically have nothing to sell. So we have to take off the chip, rebuild the system, and at least now we have a modular computer to sell. So that was a very difficult time.

Q. Okay. So the first generation that you actually released did not have the chip with the serial bus; is that correct?

A. Yeah. This file doesn't really -- doesn't -- is not protected by my invention for the serial bus. No.

Q. Okay. Thank you.

What was it called? I do want to talk about that.

A. We call it the iMod, and the whole array of console stuff we called Interputer system.

Q. So why don't you pick up the iMod, and please explain to the jury what the iMod is.

A. Well, this is the outside. I can't show you

the inside. This is the processor we put in. This is the hard drive at the time. These are the memory. It has system logic chips. It has graphics chips because it has to have that.

Q. So --

A. This is everything.

Q. To use a very technical term, Dr. Chu, is that the guts of the computer?

A. Yes.

Q. Okay. And then can you please explain to us how this works? And we have an Interputer over here, and I'll try and show.

A. Yeah. This is a desktop console. It's fairly inexpensive because it doesn't have too much circuitry in it. So if you open up the latch. And then you can stick the computer module inside. Close the latch. So that's your desktop computer.

And you can open the latch again, take this computer module, bring it home, where if you have another console like that, you just use it. It's the same computer. There's no change.

MR. COLLARD: Your Honor, I request permission to pass this, let the jury take a look at this if they'd like?

THE COURT: Sure.

11:36 BY MR. COLLARD:
11:36 Q. So you mentioned that this version did not have the serial bus chip.
11:36 Were you planning to come back to that chip and use the serial bus in future versions of the Interputer?
11:37 A. We sort of have to because as I said, this is not a protected design, and it's not future-proof because these are using the old buses. So if I keep using this, if it becomes a very good idea, anybody can use it.
11:37 But the serial computer bus that I created, it's protected by patents and also future-proof for multiple generations of these products.
11:37 Q. Did ACQIS need more funds to try to do a second generation of the Interputer with the serial bus?
11:37 A. Yes.
11:37 Q. Did ACQIS get more funds to try to do the second generation of the Interputer?
11:37 A. I think I tap out my family and relatives and friends, so they don't give me more money.
11:37 Q. If you had the funding and the engineers, did you have any concerns about being able to successfully develop and use a chip with the serial bus in the

11:38 second generation of the Interputer?

11:38 A. Absolutely.

11:38 Q. Absolutely you had concerns or no concerns?

11:38 A. I can develop a chip of this complexity because I've done much more complex chips also.

11:38 Q. Okay. So you were not concerned about being able to do that from a technical perspective?

11:38 A. Not technical.

11:38 Q. Okay. Was there industry recognition of the new ACQIS product?

11:38 A. Yes. They like the modular aspect of this design. It was unique at the time.

11:38 MR. COLLARD: Let's look at PD-10, please. And perfect. There we go.

BY MR. COLLARD:

11:38 Q. This is WIRED Magazine.

11:38 And what did they say about your iMod?

11:38 A. It highlights the fact that this is one part. We were trying to sell the system now. And so this -- they also list how much it cost and where you can get it.

11:39 Q. Great.

11:39 MR. COLLARD: And then let's look at PD-11, which I think is the PC World magazine. Great. Thank you.

11:39 BY MR. COLLARD:
11:39 Q. And what did PC World say about your modular computer design?
11:39 A. Well, the editor actually like the system, so -- but they are a pretty reputable company. So they said, send us the system. We need to test it, whether it works or not.
11:39 So they did. And then it worked. So they wrote it up.
11:39 Q. Okay. And they say in here that -- do you see where they say it's "a 1-pound module slightly larger than a VHS tape"?
11:39 That's how they described it back then.
11:39 A. Yeah.
11:39 Q. I want to talk a little bit about the chip, just so -- a little more about the chip.
11:40 And can you explain to the jury -- do you have any of the chips that you -- you were working on at that time? Do you have any of those with you?
11:40 A. Yeah. We kept it even though it's not a working chip. So these are chips that we get packaged from the silicon we built.
11:40 Q. Make sure you stay by the microphone, Dr. Chu.
11:40 A. Oh, sorry.
11:40 Yeah. These are chips that were supposed to

be our interface controller to control the serial bus, but it didn't work.

Q. Okay. And let's look at the wafer that you brought with you.

What is a wafer?

A. Well, you put -- I mentioned earlier for integrated circuits, you put it on a silicon wafer. I have one here to show you.

That's a silicon wafer.

Q. So what is a silicon wafer?

A. So you print your chip a tiny square on here, and then you replicate it so that on this wafer you have, you know, a few -- you have a couple hundred devices for cost reason, of course.

Q. So are there more than one -- does that item get cut up?

A. Yes. You go to another company, they cut it up, and then you won't see it, but there are pads on the chip that you then bond it to the external package device so that it becomes a working device.

Q. Okay. Were any of ACQIS' suppliers in Texas, Dr. Chu?

A. Yes.

Q. Who?

A. A company called PS Solution. They're the

company to work with. They built the aluminum casing. They help us design. And they also did injection mold for these front and back.

Q. And is there any relationship with PS Solutions today?

A. Yes. They are a shareholder.

Q. A shareholder?

A. Yes.

Q. Did you sell any of these iMods and Interputers?

A. We sold mostly these small computers to -- couple hundred of them.

Q. And did ACQIS make money off of those sales?

A. Yes. We did.

Q. Did ACQIS make enough money to keep its business going?

A. No.

Q. So what happened then?

A. I -- so, as I said, we didn't have a lot of money. So we have -- I decided that we had to sell the hardware business to a company called Multivision. They are NVIDIA surveillance. They're one of our customers. So they agreed to buy our hardware business.

What we were very careful of was this

11:43 product --

11:43 Q. Well, so you sold the hardware business?

11:43 A. Yes.

11:43 Q. And then what?

11:43 A. And then I -- I was able to spend time working 11:43 on protecting my invention.

11:43 Q. Okay. So even though ACQIS didn't have enough 11:43 funding to continue its computer and chip business, why 11:43 did you continue to pursue your patents and your 11:43 protection of your invention?

11:43 A. Because that's really, in some sense, the 11:43 essence of the company.

11:43 Q. And was ACQIS awarded patents as a result of 11:43 those efforts?

11:43 A. Yes. We ultimately had about 30 patents.

11:43 Q. So about 30 patents total?

11:43 A. Yes.

11:43 Q. Okay. And do you remember roughly when ACQIS 11:43 got its first patent?

11:43 A. The first one was probably 2001.

11:44 Q. All right. Let's -- well, what are these, 11:44 Dr. Chu?

11:44 And I'm looking at --

11:44 MR. COLLARD: Well, let me, before I do 11:44 that, move to admit J-1 through 5, the patents.

11:44 MR. BURESH: No objection.
11:44 THE COURT: Admitted.
11:44 MR. COLLARD: Thank you.
BY MR. COLLARD:
11:44 Q. Dr. Chu, what are these that I'm holding up here?
11:44 A. These are five of my 30 patents.
11:44 Q. Okay. And who put this ribbon and this seal on these patents?
11:44 A. We received this from the U.S. Patent Office. They -- this is the -- they have only one original of the patent. So this is -- they put their gold seal on there.
11:44 Q. Okay. Let's look at one.
11:44 MR. COLLARD: Let's look at J-1, and we'll do that on the screen so we can look at some parts a little more closely.
11:44 So let's kind of look at the top thirdish of this.
BY MR. COLLARD:
11:45 Q. Who is the inventor listed on these patents?
11:45 A. Yeah. It's me.
11:45 Q. All right. So in all -- is that true for all the patents? Are you a named inventor on all of the patents that are asserted in this case?

A. It's -- I'm the only inventor.
Q. All right. And what is this information at the top over on the right?
A. Once they examine your disclosure and your claims, when they give you the rights to this patent, they give you a unique name, a unique number. In this case, it's 9,529,768.
And then they tell you when your patent is granted, which is the date below that.
Q. So this date is 2016. And we're not going to flip through, but all the dates on the patents are from, I think, December 2013 to December 2016 for the patents in this case.
But as we've been talking about today, we talked about a lot of the work that was done, and it was done in the early 2000s.
Can you explain why the date on these patents is later even if the work we were talking about was done in the early 2000s?
A. Yes. You know, I filed 30 patents. Each patent I have to do credible work. I actually wrote most of the claims in the patent.
So in the early days when I was writing the patent, I was writing the -- I was trying to put down the invention both for modular system in this case and

11:46 the computer bus. So it's a -- those -- most of those patents has this modular aspect in the invention.

11:46 Then what I realized after that is that the modular aspect is actually not quite too important. In fact, it restricted what I can claim because basically if it's not a modular computer, you really -- if your claim says it's a modular computer, then you don't have any rights to non-modular computer.

11:47 So I started a whole group of patents that only focuses on the various way of using the computer bus for different types of computers. So "computer" would encompass really -- pretty much everything. It encompass desktop, notebook, servers, smartphone, and even game consoles.

11:47 So in order to cover that breadth of products, I have to come up with all the possible configuration that they can use my computer bus.

11:47 So these are purely -- the later patents are purely focused on computer bus. It has nothing to do really with the modular computer. So you will see in the claims there's no word mentioned as "modular." So it's a different thing. It's a separate type of invention.

11:48 Q. Do all the inventions that are in these later patents still relate back to the work that you did in

11:48 the late '90s and early 2000s and the white papers that we looked at?

11:48 A. Absolutely. The Patent Office would never give you a patent if you were not disclosed properly. And the later patents is actually -- there's a history that they are a continuation of the invention that I have, so everything being traced back to the provisional patent you saw that we were -- was filed in 1998.

11:48 Q. We'll go back -- we'll look at that, Dr. Chu, in a second.

11:48 A. Okay.

11:48 Q. Who is the owner of the patents today?

11:49 A. ACQIS LLC, which is the subsidiary of ACQIS Technology.

11:49 Q. Okay. Let's go to exactly what you were saying.

11:49 MR. COLLARD: Let's look at Page 2.

11:49 At the top, it says: U.S. -- related U.S. application data. Let's call that out.

11:49 And can we get that bottom part there too, please?

11:49 The line -- that 60. That Line 60.

11:49 Perfect.

BY MR. COLLARD:

Q. What is this, Dr. Chu?
A. As I said, it traces the history of this particular patent that was issued. And it goes back to -- if you look at the bottom, it trace back to the application that I filed in May 14, 1999.
Q. Great.
Now, I want to look at another part of this page, Page 2. And where it says: References cited.
Do you see that?
A. Yes. Yes.
Q. Dr. Chu, can you describe for the jury, what is prior art?
A. When you want to file a patent, you have to tell the Patent Office everything you know prior to my invention date. Meaning, anything that is published in public or patents that were filed before my invention date, anything we know, we have to tell the patent examiner those information.
MR. COLLARD: So, Vicki, if you would please kind of slowly flip through Pages 2 through 14?
BY MR. COLLARD:
Q. What is -- does this all show prior art that you cited to -- that ACQIS cited to the Patent Office, Dr. Chu?
A. Yes.

Q. Okay. And in your experience with patents, is this a lot of prior art?

A. It's really a lot because on the first couple of applications, we made -- we had less than ten prior art. But because these patents has been challenged by many companies, and each time they challenge them, we tell the Patent Office more prior art, we have to include everything into this application.

Q. Dr. Chu, what is the duty of candor as it relates to patents? Do you know?

A. Well, we take it very seriously. If you know about -- if you know about the prior art and you don't tell the Patent Office, you loses your patent.

Q. I want to be clear about when in the process this information was disclosed to the Patent Office.

Was it before the patent was issued, or was it after the patent was issued?

A. Of course before.

Q. Before.

And so even though ACQIS disclosed all this information, did the patents still issue?

A. Yes.

Q. Now, Dr. Chu, were you paying attention to developments in the computer industry during the 2000s?

A. Yes. I was.

11:51 Q. Was there a shift in the computer industry during the 2000s?
11:51 A. Yes. There was.
11:51 Q. Can you please describe for the jury what that shift was as it related to computer buses?
11:52 A. I think you've heard about this standard called PCI Express and USB 3.0. So when I saw the standard, it uses -- before PCI was a parallel bus. Now they start to use LVDS unidirectional channel for transmitting PCI.
11:52 Q. So what was -- we'll talk about that a little more.
11:52 For -- and was there a USB standard that was adopted that you were paying attention to in the mid 2000s?
11:52 A. Yeah. It happened, I think, to ACQIS like ten years after my invention. Yes.
11:52 Q. Okay. And I want to be clear for the jury, were you involved, you personally or ACQIS, in any way in the creation of the PCI Express standard or the USB 3.0 standard?
11:52 A. No. I wasn't involved. Our company wasn't involved. No.
11:52 Q. Do you claim that you invented PCI Express or USB 3.0?

A. No. Of course not.
Q. Okay. Were these buses -- did they use serial communication like your bus that you designed?
A. Yes. The serial bus, the way I used it, yes.
Q. Okay. So were you aware that computer companies were starting to move to these serial buses?
A. Yeah. Like, I think like counsel mentioned, you know, there are many companies involved in creating the full bus. A lot of them are licensees. Yeah.
Q. So here's my question about that: Do these bus standards, these PCI Express and the USB 3.0, do they share any common elements with the serial bus that you invented?
A. Yes.
Q. Can you please tell the jury what elements -- what common elements that they share?
A. Remember when I was developing my universal bus, I choose to use LVDS technology. I choose to use this concept of unidirectional so the data can only -- can go both ways without interfering with each other. That's really the fundamental concept that's being used by PCI Express and USB 3.0.
Q. Do your patent claims, the claims in these patents that we're going to talk about this week, do these patent claims require everything that's required

by PCI Express and USB 3.0?

A. Not at all. I think it's misleading to say. PCI Express, the standard is 200, 300 pages. It has so many things to see how it works.

All we're claiming is that they're using LVDS signaling, which I used, and the unidirectional approach. That's all I'm claiming. In fact, everything relies on that fact. That's the invention I had.

But if they did not have that, if they did not use that, the two standards could not exist.

Q. Did you contact any of the computer companies that sold products that adopted these new serial bus standards?

A. Yes.

Q. And why did you do that?

A. Given the patent rights that this has for me, I'd like to talk to them about licensing.

Q. Okay. And I'm jumping ahead a bit here.

But did any of those companies actually pay ACQIS for a license to the ACQIS patents?

A. We have, I believe, 21 companies to pay us.

Q. All right. And how are licenses usually documented?

A. It's -- it's -- you do a license agreement.

11:56 It's a patent license agreement with each company signed by both sides.

11:56 Q. Okay. And so there's a contract?

11:56 A. Oh, absolutely. Yes.

11:56 Q. All right.

11:56 MR. COLLARD: Move to admit Exhibit P-920, which is the summary of the licenses that we discussed previously.

11:56 MR. BURESH: Just the existing objections from this morning, Your Honor. Nothing further.

11:56 THE COURT: They'll be admitted.

11:56 MR. COLLARD: All right. Let's take a look at Exhibit 920, please.

BY MR. COLLARD:

11:56 Q. Dr. Chu, this is a two-page document. We're going to take it one page at a time. And I want to make sure, have you personally confirmed that the information in this summary matches the information in the underlying contracts that you signed?

11:57 A. I did verify it. Yes.

11:57 Q. All right. Great.

11:57 Let's talk about this first column, Licensee.

11:57 What does that mean?

11:57 A. These are the companies that agreed to license our patent rights.

11:57 Q. Okay. And what about the third column, Date?

11:57 A. The third column, yeah, the date is when we signed an agreement.

11:57 Q. And so when did these companies begin taking licenses?

11:57 A. We essentially have two groups of time frame. I mention earlier that when -- where I was developing my patent, the first group I was focus on modular computer and the computer bus.

11:57 So this first group of company was building modular computer and also using the computer bus. So I talk to them.

11:58 Q. Thank you, Dr. Chu.

11:58 And I want to talk about how ACQIS approached negotiations with these companies.

11:58 What was ACQIS hoping to receive in return for granting a license?

11:58 A. In the early days, we were asking for 3 to 5 percent of the royalty. Yes.

11:58 Q. But you were seeking money, a payment?

11:58 A. Yes.

11:58 Q. And let's talk about this Effective Royalty Rate column. And I think you said you were seeking 3 to 5 percent.

11:58 But before we get into that, can you please

tell the jury -- can you just kind of start with what is a royalty rate?

A. Your royalty rate is really just you take the revenue of infringing product, and you ask for a certain percentage of that, and that is the royalty rate.

Q. Thank you.

And do you know what a lump-sum license payment is?

A. Yes. Uh-huh.

Q. Can you explain to the jury what a lump-sum license payment is?

A. Well, a lot of times we cannot agree on the royalty rate because we just -- in the negotiation, they won't agree to a number. So -- but instead what they will say -- licensee will say, I'm willing to pay you a fixed amount of money so that you don't come bother us anymore.

So that's kind of the lump-sum agreement, that we said, fine. We'll take that money and that's it.

Q. So if there's no effective royalty rate listed, does that mean that it was a lump-sum payment?

A. Yes.

Q. All right. And what about this column that's called Additional Compensation to ACQIS?

Do you see that?

A. Yes. Uh-huh.

Q. Why was ACQIS accepting other types of compensation in some of these contracts?

A. It's a small part of the negotiation. Sometimes they want to have a lower -- they want to pay less. So you put in some -- some cases they, for instance, exchanged patents with us, which allows them to maybe pay less.

MR. COLLARD: Okay. Before I leave this slide, I'd like to move to admit the joint exhibits here. So J-34, J-32, J-27, J-28, and J-31.

MR. BURESH: No objection.

THE COURT: Admitted.

MR. COLLARD: Thank you.

All right. Let's go to the next slide, please.

BY MR. COLLARD:

Q. So what are the dates for this range of licenses?

A. Well, you have IBM roughly the same time frame as the earlier companies that licensed our patents, and the rest, it's later.

Q. Okay. So for this effective royalty rate column, is this the same as the previous slide, where

if you had an effective royalty rate, you've listed it here, but otherwise, these were lump-sum settlement payments -- or lump-sum license payments?
A. Yes. It's the same.
Q. Okay. And these effective royalty rates are closer to 1 percent than the 3 to 5 percent we saw on the previous slide?
A. Yes.
Q. Was there a time where ACQIS' approach to licensing changed?
A. Yes. There was.
Q. Which license did it change in respect to?
A. You know, licensing experience with IBM, it's such that we find out that it's publicly more appropriate for us to ask for 1 percent per invention. We should not be asking for 3 to 5 percent.
Q. Okay.
A. So since then, we changed our position.
Q. Is that still the approach that ACQIS uses today of 1 percent per invention?
A. Yes.
Q. In your view, how many inventions are issued in this case?
A. Broadly speaking, we -- since we only focus on computer bus, we are talking about a one invention for

12:02 the PCI Express standard, one invention for the USB 3.0, and in some sense it covers -- mainly it's those two.

12:02 Q. Okay. You said you think it's two. Is that what you said?

12:02 A. Yes.

12:02 Q. Two. Okay.

12:02 MR. COLLARD: And before we leave this slide, I'll move to admit J-29, J-33, J-30, J-38, J-39, J-40, J-21, and J-52.

12:02 MR. BURESH: No objection.

12:02 THE COURT: Admitted.

12:02 BY MR. COLLARD:

12:02 Q. So if a company ACQIS was negotiating with -- and I want to talk a little more about the negotiation approach.

12:03 If they have -- if that company has products that don't use the ACQIS technology, is that something that ACQIS would want to include in the negotiation?

12:03 A. No. Absolutely not.

12:03 Q. Why not?

12:03 A. Well, if you don't have the patent rights, you shouldn't ask for -- anybody for anything.

12:03 Q. Okay. What about within an individual product? If there are parts of an individual product

that don't use the ACQIS technology, how does ACQIS approach that in negotiations?

A. We don't normally try to put pieces that are not infringed as part of the calculation, but it's not that straightforward. A lot of times it's up to the damage expert to determine whether that part is necessary in order to infringe the patent. So it's a judgment.

Q. Do you have any examples of something that ACQIS would not seek to include in the negotiation for a product?

A. Yes. Like in the laptop computer, we do not include the display as part of the invention because our invention relates to the computer itself.

Q. What about software?

A. Oh, no. No software.

Q. Okay.

A. No software.

Q. Okay. At some point did you become aware of ASUS computer products that were using serial bus technology?

A. Yes.

Q. And what did you do?

A. I sent them a letter.

MR. COLLARD: Okay. Move to admit P-50,

12:04 as discussed before.

12:04 I stopped the video. So can you pull it up, please, Vicki? I just want to check it.

12:04 And then Page 2.

12:04 Okay. Move to admit P-50 as it's shown.

12:04 MR. BURESH: No objection.

12:04 THE COURT: Be admitted.

12:05 BY MR. COLLARD:

12:05 Q. So let's take a look at the first page of P-50.

12:05 What is this document?

12:05 A. It's a letter I wrote, and I sent it to the CEO of ASUS.

12:05 Q. And when did you -- did you write this letter?

12:05 A. Yes.

12:05 Q. And when did you send it?

12:05 A. May 15, 2018.

12:05 Q. Okay. Why did you list the recipient here as ASUS?

12:05 A. If you -- if I -- I look into the company, and actually it's all of course information from the web -- website. So ASUS.com is the -- is the website I go into. It details all their product as ASUS product.

12:05 It has also any report that shows the structure of the company, and I certainly want to

notify the controlling party, which is the top of the chain -- and in this case, it would be Jerry Shen. He is head of the whole ASUS group -- so that he's aware of the infringement since he controls the whole organization.

Q. Okay. And why did you choose to put Partnering, Licensing, and Collaboration Opportunity in the subject line? What did that mean to you?

A. It means we are flexible. We like to talk. And we just don't want to sound too threatening at that point.

Q. So you also mentioned opportunities to partner in the first paragraph.

Have you partnered with other licensees in previous licenses? And it would be beyond just money.

A. We did. I mean, I mentioned exchange of patent rights. Actually, one company, we had a joint development agreement. But yes.

Q. Okay. And then let's go down to the next paragraph.

Did you mention in this letter which serial bus technologies ASUS might be using that this letter would apply to?

A. Yes. I did.

Q. Where was that?

A. You know, you see PCI Express and USB 3.0 mentioned.

Q. Okay. Where you say it's relevant to PCI Express and USB 3.0?

A. Yes. We want to make their job easier to look for where potentially there's infringement. So we tell them, these are the technologies you should look at.

Q. Okay. Why did you determine that PCI Express and USB 3.0 were relevant to your invention?

A. Remember I said earlier, my invention and my only invention in the computer bus is using this LVDS channel, the unidirectional channel, to communicate data. And in both of these cases, that's what they use.

Q. Thank you.

So based on your experiencing monitoring -- your experience and your monitoring of the computer industry, did you believe that using these technologies, these -- the low voltage differential unidirectional serial channel, did you believe that was benefitting ASUS?

A. Yes. Absolutely.

Q. How?

A. Well, if they don't support these standards, they cannot sell any computer.

12:08 Q. Okay.
12:08 MR. COLLARD: Let's look at the next paragraph, please.
BY MR. COLLARD:
12:08 Q. So you said you were trying to start with the appropriate tone, but did you do anything in your letter to try to convey a seriousness of the -- what you were saying in the letter?
12:09 A. We tried to tell them that our patent has been tested by the U.S. Patent Office multiple times. It's not just a issuing of the patent.
12:09 Q. Okay.
12:09 A. So it's -- it's to say that our patent is pretty solid.
12:09 Q. And did you mention prior licensees in this paragraph as well?
12:09 A. Yeah. I mentioned like four Fortune Global 200 companies. A company like Dell would be one of them.
12:09 Q. What were you trying to convey to ASUS by mentioning this in the letter that you wrote and sent to them?
12:09 A. Of course I want to impress them that even the big companies is willing to license our patents. So they should really consider that.

12:09 Q. Great.
12:09 MR. COLLARD: Let's go on to the second page, please.
12:09 And maybe we can get -- I think all we need is starting with "to assist."
12:10 BY MR. COLLARD:
12:10 Q. You list -- did you choose which patents to list here?
12:10 A. Yes. I did.
12:10 Q. How did you choose which ACQIS patents to identify?
12:10 A. Well, since I wrote all the claims, I know what these patents were. And the claims covers really, as I said, any way of using the invention in the computer system. So to be thorough, I put down all the patents that could potentially infringe.
12:10 Q. Are the five patents that are asserted this week, are these patents listed in your letter here?
12:10 A. Yes.
12:10 Q. Okay. Do you agree that some of these patents expired or all of -- the last of these patents expired in -- around May 2020?
12:10 A. Yes.
12:10 Q. Does that concern you that the patents were getting close to expiration when you sent your letter?

A. No. No.

Q. Can you explain to the jury why that wasn't a concern for you?

A. The way you can seek damage is that the damage starts when you send them the notification letter. They need to know that they have infringed. Otherwise, it doesn't mean anything.

That's one part of the patent. What we call apparatus patent, where you just describe the computer.

There's another type of patent we call method claims, what describes the manufacturing of those products, which you really do not need to mark the product, maybe.

And the patent system allows you to -- at the time when you file a patent, it goes back six years.

Q. At the time you file your patent or the time you file a patent lawsuit?

A. So when you file your lawsuit, you will go back six years --

Q. Okay.

A. -- to cover the infringement period.

Q. Thank you, Dr. Chu.

You also have a section here where you identified some ASUS products.

Do you see that?

A. Yes.

Q. How did you choose what ASUS products to identify?

A. So I go on the website, look at ASUS.com. I look at their products. So two things would tell me whether they infringe. They will a lot of times say, we support PCI Express and USB 3.0. Of course that's one of the indication. But actually, it's more than that.

I mention Intel has a monopoly in the computer business. Everybody uses their processors and logic chips. So I have knowledge of how Intel requires their customers to build their system. So if you use this CPU, you have to use this system logic.

And they've clearly showed that if you use this system logic, you will have -- you'll be supporting PCI Express or USB 3.0.

So given the two combination knowledge, it's not hard for me since I know computer very well to determine that, oh, this product uses Intel CPU, in some cases also AMD. And then they also say that they support PCI Express.

So it's not hard for me to look through their website, see what product they sell to say that they infringe.

12:13 Q. Thank you, Dr. Chu.
12:13 You listed four categories here: Portable computers, desktop computers, server products, and something called motherboard product.
12:13 Do you see where I am?
12:13 A. Yes. Uh-huh.
12:13 Q. Are all four categories of ASUS products still being accused of infringement today in this suit?
12:13 A. Yes.
12:13 Q. All right. I want to go back a little bit to your unidirectional LVDS serial bus.
12:13 Did your analysis tell you that you just described -- you described the things you looked at. You looked at the processor, and you looked at some information about the products online.
12:13 Did your analysis tell you whether these ASUS products listed here used -- and I'm going to take this in pieces.
12:14 Did it tell you whether they used a serial bus?
12:14 A. Yes. Uh-huh.
12:14 Q. Okay. And did they use a serial bus?
12:14 A. Yes.
12:14 Q. Did your analysis tell you whether they used unidirectional LVDS channels?

A. Yes.
Q. And beyond what you've already described, was there any other way that you knew that?
And maybe not. I just -- you already described looking online and looking at the type of processor that they were using.
Was that enough to tell you that information?
A. It tells me 100 percent they use it. Yes.
Q. And was that relevant to your patents?
A. That -- those are my patents.
Q. Did ACQIS retain an independent expert to review any material that ASUS produced about its products and do a detailed analysis of infringement for this case?
A. Yeah. We have a very nice gentleman, Dr. Sarhan, to do that analysis. Yes.
Q. Okay. When you sent this letter, how did you send it?
A. I sent it by FedEx and request a confirmation of delivery.
Q. Did you get a delivery confirmation?
A. Yeah. They send me an e-mail to say it was delivered. Yes.
MR. COLLARD: Move to admit P-51.
MR. BURESH: No objection.

THE COURT: Admitted.

MR. COLLARD: Let's take a look at that. Let's look at the top half first.

BY MR. COLLARD:

Q. What is this showing?

A. Well, it's this e-mail I got. I think if you're familiar with FedEx, you can ask for a tracking update. So they told me that it was delivered to ASUSTeK Computer on May 18th.

Q. Okay.

MR. COLLARD: And let's look at the bottom half.

BY MR. COLLARD:

Q. What does -- what does that show?

A. It shows somebody signed for it, a Mr. Lee, who's the receptionist/front desk person. And the time of, I guess, delivery, 3:30.

Q. Did ACQIS reach out to FedEx to see if FedEx had any evidence of delivering the letter to ASUS?

A. Yes. We did.

Q. All right.

MR. COLLARD: Move to admit exhibits P-837 and 838.

MR. BURESH: No objection.

THE COURT: Admitted.

MR. COLLARD: Let's start with 838, please.

BY MR. COLLARD:

Q. Did ACQIS get a response from FedEx?

Sorry. I'm not sure if I asked that.

Did ACQIS get a response from FedEx when they reached out to see if FedEx had a record?

A. Yes.

Q. What is this document? This is P-838.

A. This is a FedEx internal document that basically documents the shipping information and basically says who signed for the letter.

Q. And in a general sense, is the information that FedEx has consistent with information on the exhibit we just looked at, P-51?

A. Yes. It was.

Q. Okay. But there's something new here, the signature image.

MR. COLLARD: Can you blow that up for me, please, Vicki?

BY MR. COLLARD:

Q. Dr. Chu, can you read that stamp?

A. Yeah. I can read Chinese.

Q. Okay. What does it say?

A. It says Lee Yen Gee. So what that means is,

12:17 Lee is Lee. And that is the same name that was shared in the e-mail confirmation I got. Yen Gee is just the rest of his name.

12:17 Q. Okay. And what about this -- it looks like maybe it says 15:30.

12:17 Do you know what that might be?

12:17 A. That's the -- I think the time that probably Mr. Lee put down. It's basically 3:30 p.m.

12:17 MR. COLLARD: Can we just look at this in this record, please?

12:18 There we go.

12:18 And then, now let's look very briefly at Exhibit 837.

12:18 And we'll blow up the content in the middle here.

BY MR. COLLARD:

12:18 Q. And what is this document, Dr. Chu?

12:18 A. As you can see, it comes from the legal department. We asked for confirmation. So they actually have notarized a document that says: This our internal document that represents delivery of the letter.

12:18 Q. Okay. So even though you got delivery confirmation at the time and FedEx confirmed that ASUS received the letter, did you receive a response from

12:18 anyone at ASUS after sending this?
12:18 A. No.
12:18 Q. Dr. Chu, has ASUS ever offered to pay for a
12:18 license to your patents at any price?
12:18 A. No.
12:18 Q. If a company like ASUS is using your patents
12:18 without a license, how does that help them?
12:18 A. It's very unfair to all my other licensees who
12:19 are their competitors. And they get to, you know, ship
12:19 their product into U.S. and -- which the products
12:19 infringes our patent rights, and they don't want to pay
12:19 anything.
12:19 Q. Okay. If a company like ASUS is using the
12:19 technology in your patents and refuses to pay for a
12:19 license, what options do you have?
12:19 A. The only option is to come here.
12:19 Q. Okay. Dr. Chu, why did you bring this lawsuit
12:19 to protect your patent rights?
12:19 A. I owe it to my licensees and also my
12:19 shareholders, which includes my family and my friends.
12:19 Q. Thank you.
12:19 MR. COLLARD: Pass the witness, Your
12:19 Honor.
12:19 THE COURT: Would now be a good time for
12:19 a break?

MR. BURESH: It would, Your Honor.

THE COURT: Okay. Ladies and gentlemen of the jury, we are going to take our recess. If you all would be back by about 1:00 -- about 1:30, 1:35, we'll get started pretty shortly after that.

I have a -- I'm the -- we have two other phenomenal magistrate judges in the courthouse, but we only have one of me, one district judge, and I have something I have to do at 1:00. And so I think it'll take about a half hour, not much longer, and I just hate to keep y'all waiting.

So let's take -- come back at 1:45 because I hate keeping you all here. And we'll get started as soon after that as I can get...

THE BAILIFF: All rise.

THE COURT: And please remember my instructions I gave you this morning.

(Jury exited the courtroom.)

THE COURT: You may step down.

Thank you. You may be seated.

So we'll have -- after this gentleman finishes, we'll have your infringement expert. Who will come after that?

MR. COLLARD: After that we will have -- go ahead.

12:21 MS. AMSTUTZ: After that we're going to call -- we will call Barbara Chen, who's the corporate representative for ASUSTeK.

12:21 THE COURT: Okay. I don't mean to insult anyone here. Will there be a translator? Will they be speaking without a translator?

12:21 MR. BURESH: No translator, Your Honor.

12:21 THE COURT: Okay. And so how far -- will that get us through the end of the day, do we think? We'll probably go till 5:30 or 6:00.

12:21 MS. AMSTUTZ: Most certainly.

12:21 THE COURT: Okay. Very good.

12:21 You all have a good lunch. If you'll be back around 1:30, as soon as we -- or 1:45 -- I think that's what I said to them -- we'll get started just as soon as I'm done with my 1 o'clock matter.

12:21 THE BAILIFF: All rise.

12:22 (Recess taken.)

01:47 THE BAILIFF: All rise.

01:47 THE COURT: Please remain standing for the jury.

01:47 (Jury entered the courtroom.)

01:48 THE COURT: Thank you. You may be seated.

01:48 Counsel?

CROSS-EXAMINATION

BY MR. BURESH:

Q. Good afternoon, Dr. Chu.

A. Good afternoon.

Q. How are you doing?

A. Good.

Q. Did you have a nice lunch?

A. Yes.

Q. Okay. Good.

I'd like to start out -- I believe you said during your direct testimony -- do you still have the little module up with you?

A. You mean this iMod?

Q. Yes, the iMod.

Now, that iMod, is that the one you actually sold 200 of?

A. Yes.

Q. Yes? Okay.

And that iMod never had your LVDS invention in it, correct?

A. It did not.

Q. Because your LVDS invention, you couldn't get it to work?

A. Correct.

Q. So what you have in this iMod you sold was the

01:49 old PCI local bus standard, correct?

01:49 A. Correct.

01:49 Q. Okay. I believe you said you started working
01:49 on your invention around Christmas of 1997; is that
01:49 correct?

01:49 A. Correct.

01:49 Q. And you wrote a series of three white papers?

01:49 A. Yes.

01:49 Q. Now, your first white paper, which we've seen
01:49 already, it was Joint Exhibit 22, it was dated
01:50 January 1st of 1998, correct?

01:50 A. Yes.

01:50 Q. And that paper took you a week to ten days to
01:50 write, between Christmas and January 1st?

01:50 A. Yes. It did.

01:50 Q. The next week you wrote your second white
01:50 paper. That was dated January 7th of 1998, correct?

01:50 A. Correct.

01:50 Q. So that one took you one week to write?

01:50 A. Yes.

01:50 Q. And after that, you wrote a third white paper
01:50 that was dated January 15th of 1998; is that correct?

01:50 A. Correct.

01:50 Q. So in total, are those three all the white
01:50 papers you wrote for this invention?

01:50 A. Those are the three white papers.
01:50 Q. Okay. So all told, you spent approximately three weeks writing down your invention in your white papers; is that correct?
01:50 A. In those white papers, yes.
01:51 MR. BURESH: Mr. Palisoul, if we could pull up J-22, please.
01:51 BY MR. BURESH:
01:51 Q. This is previously admitted. So I want to look at the title of your first white paper. It is A Personal Computer with Attached Computer Module inside a Computer Bay within a Peripheral Console.
01:51 Do you see that?
01:51 A. Yes.
01:51 Q. So that piece that's in front of you there is what you were calling the "attached computer module"; is that correct?
01:51 A. Correct.
01:51 Q. And this piece over here would be the peripheral console, correct?
01:51 A. Correct.
01:51 Q. And that slot there is called the bay, correct?
01:51 A. Yes. Uh-huh.
01:51 MR. BURESH: If we could go to the

01:51 abstract, Bates No. 8129.
01:52 BY MR. BURESH:
01:52 Q. You were calling this: A new type of personal computer referred to as the Attached Personal Computer, AttachPC; is that correct?
01:52 A. Yes. Uh-huh.
01:52 Q. That's what you invented?
01:52 A. Yes.
01:52 Q. Okay. And again, the AttachPC is made up of a removable computer module called the "ACM," correct?
01:52 A. Yes. Uh-huh.
01:52 Q. And that would go inside of the peripheral console using the bay we just discussed?
01:52 A. Correct.
01:52 MR. BURESH: If we could go to Figure 1, please.
01:52 BY MR. BURESH:
01:52 Q. Figure 1 from your first white paper, J-22, is an example of a desktop attached personal computer, correct?
01:52 A. Yes.
01:52 Q. And that shows an attached computer module that would be inserted into a peripheral console, correct?
01:52 A. Correct.

01:53 MR. BURESH: If we can go to Figure 2, please.
01:53 BY MR. BURESH:
01:53 Q. Figure 2 shows an example of a portable attached personal computer, correct?
01:53 A. Correct.
01:53 Q. Okay. And here you have an attached computer module that, again, go into a portable peripheral console, correct?
01:53 A. Correct.
01:53 Q. Now, this is not a laptop, is it?
01:53 A. Of course it is.
01:53 Q. Okay. Now, when my clients' laptops are sold, is there any module that comes out of them?
01:53 A. A modular computer and laptop are two separate things.
01:53 Q. Okay. A laptop is not a modular computer?
01:53 A. Laptop does not need to be a modular computer. Correct.
01:54 MR. BURESH: Okay. If we could pull up DX-63, please.
01:54 BY MR. BURESH:
01:54 Q. Do you recognize the document that's on the screen in front of you?
01:54 A. Yes.

01:54 Q. What is it?
01:54 A. It's a presentation I made.
01:54 Q. To Compaq Computer?
01:54 A. Yes.
Q. Okay.
01:54 MR. BURESH: Your Honor, I move to admit Defendant's Exhibit 63.
01:54 MR. COLLARD: No objection.
01:54 THE COURT: Admitted.
01:54 BY MR. BURESH:
01:55 Q. Okay. Again, this is a June 1998 presentation that you gave to Compaq; is that fair?
01:55 A. Yes. Uh-huh.
Q. Okay.
01:55 MR. BURESH: If we could go to the Meeting Purpose, please.
01:55 BY MR. BURESH:
01:55 Q. A purpose of your meeting with Compaq was, according to the first bullet, to disclose your invention, benefits, technology, and market analysis, correct?
01:55 A. Yes. Uh-huh.
01:55 Q. And you wanted to discuss business opportunities, correct?
01:55 A. Yes.

01:55 Q. Or partnership?
01:55 A. Yes.
01:55 Q. Okay. On the next page --
01:55 MR. BURESH: Turn to the next page, please.
01:55 BY MR. BURESH:
01:55 Q. -- here you describe your invention as the attached computer module; is that correct?
01:55 A. Yes.
01:55 Q. And the ACM, as we heard during your direct testimony, is what you would consider the guts of a computer system, correct?
01:55 A. Yes.
01:55 Q. By "guts," it would include a CPU, correct?
01:56 A. Uh-huh. Yes.
01:56 Q. Main memory?
01:56 A. Yes.
01:56 Q. Graphics subsystems?
01:56 A. Yes.
01:56 Q. Those sorts of things, correct?
A. Correct.
01:56 Q. And again, this is a small device, about the size of a VHS tape that you have in front of you here today?
01:56 A. Correct.

MR. BURESH: If we could go to the next page, please.

BY MR. BURESH:

Q. As we see here, you can transport your ACM from home to office, but you have to have a console in both places, correct?

A. Yes.

MR. BURESH: If you'd go to the next page.

BY MR. BURESH:

Q. You describe to Compaq in this presentation a variety of console options. Is that fair to say?

A. Yes. Uh-huh.

Q. Okay. Including a minimal portable console, you called it?

A. Yes.

Q. Okay. And you're referring here to Desktop ACM Mobility versus Notebook at the title of that slide.

Do you see that?

A. Yes.

Q. So again, you're distinguishing your invention from a notebook computer, correct?

A. From a pure notebook. Yes. Uh-huh.

Q. Okay. And the notebook would be synonymous

01:57 with a laptop?
01:57 A. Yes.
01:57 Q. So you weren't telling Compaq or anyone else that you developed a laptop computer, correct?
01:57 A. It was developing a modular system can be used as a laptop.
01:57 Q. But it was not a laptop, correct?
01:57 A. I guess it's wording. If it's used as a laptop, it is not constructed as a regular laptop.
Q. Okay.
01:57 MR. BURESH: Let's go back to the first white paper, Joint Exhibit 22, please.
01:57 BY MR. BURESH:
01:58 Q. Now, in this paper, you also described your idea for communicating between the ACM and the peripheral console, correct?
01:58 A. Correct.
01:58 Q. Okay.
01:58 MR. BURESH: If we could go -- let's see -- Page 6, please. J-22-6.
01:58 BY MR. BURESH:
01:58 Q. Now, the mechanism you described in this paper for handling the communication between your ACM and the peripheral console was called an XP Bus; is that correct?

01:58 A. Correct.
01:58 Q. Okay. And the XP Bus is an abbreviation for
01:58 cross peripheral bus; is that correct?
01:58 A. Yes. Uh-huh.
01:58 Q. Okay. And you see in the first sentence on
01:58 Page 6 from J-22, the XP Bus is also referred to as a
01:59 peripheral bridge bus.
01:59 Do you see that?
01:59 A. Yes.
01:59 Q. So the XP Bus is a peripheral bridge bus
01:59 between the ACM module and the peripheral console,
01:59 correct?
01:59 A. Correct.
01:59 Q. I believe you talked about Figure 5 during
01:59 your direct testimony?
01:59 MR. BURESH: If we could pull that up,
01:59 please.
BY MR. BURESH:
01:59 Q. Now, here we see the attached computer module
01:59 on the left, correct?
01:59 A. Correct.
01:59 Q. And a peripheral console on the right,
01:59 correct?
01:59 A. Correct.
01:59 Q. And your XP Bus is bridging those two,

correct?

A. Correct.

Q. Now, there is only one XP Bus in your invention, correct?

A. I want to understand your question. What do you mean, there is one XP Bus?

Q. Sure.

You have one XP Bus depicted -- I'll narrow it down for you.

In Figure 5, there's just one XP Bus, correct?

A. Yes. Uh-huh.

Q. And in any of your disclosures, I'm broadening it out, there is no embodiment with more than one XP Bus; is that correct?

A. That's a broad statement. In all the embodiment you mention, there is no bus that's more than one XP Bus?

Q. Yeah. Let me say the question again. Maybe slightly rephrase it, okay?

You would agree with me that you don't have a specific disclosure of an embodiment with two XP Buses; isn't that correct?

A. No. Not correct.

Q. Okay.

MR. BURESH: Mr. Palisoul, could you pull

up the 2/13/2024 transcript?

BY MR. BURESH:

Q. Were you deposed on February 13th of 2024 in a proceeding, Dr. Chu?

A. Yes. Uh-huh.

Q. Okay.

MR. BURESH: Could you turn to Page 225 in the area around Line 9 through 15, please?

BY MR. BURESH:

Q. Now, during a deposition, you are under oath, correct?

A. Yes. I was.

Q. Now, I'll ask you to read the transcript in front of you.

Does that refresh your recollection?

A. Okay. Yes.

Q. And I'll ask you the question again.

Would you agree with me that you don't have a specific disclosure of an embodiment with two XP Buses; is that correct?

A. That's correct. The answer was correct.

Q. Thank you.

Coming back to Figure 5, Dr. Chu, you have what's called interface controllers on both sides. One on the attached computer modular, and one on the

02:02 peripheral console; is that correct?
02:02 A. Correct.
02:02 Q. Now, in Figure 5, there's multiple different peripheral buses being depicted coming into and out of your interface controllers, correct?
02:02 A. Yes.
02:02 Q. I'm sorry.
02:03 MR. BURESH: Back to J-22. Thank you for the note. Now we're all together.
02:03 BY MR. BURESH:
02:03 Q. Back to Figure 5.
02:03 All right. Coming into and out of your interface controllers are a number of peripheral buses, correct?
02:03 A. Correct.
02:03 Q. Okay. Now, we've talked about PCI before, so I'll start there. It's the second line down on the left on the attached computer module.
02:03 Do you see that?
02:03 A. Yes.
02:03 Q. Now, that is the PCI local bus, correct?
02:03 A. Correct.
02:03 Q. That was a standard that had been around for eight or nine years prior to your invention, correct?
02:03 A. Correct.

02:03 Q. Okay. The next one down is USB.
02:03 Do you see that?
02:03 A. Yes.
02:04 Q. And that's a standard that had been around since around 1993; is that correct?
02:04 A. Yeah. Probably. Uh-huh.
02:04 Q. Okay. So those bus standards are being sent into your host interface controller, correct?
02:04 A. Yes.
02:04 Q. Okay. And then inside of your host interface controller, you are converting and merging all of those peripheral bus signals onto your XP Bus; is that fair?
02:04 A. Yes.
02:04 Q. And you'll carry those across the XP Bus to a peripheral interface controller, correct?
02:04 A. Yes.
02:04 Q. And your peripheral interface controller will reconvert those signals back into their original standards, correct?
02:04 A. Correct. Uh-huh.
02:04 Q. So you have industry standard buses on both sides, on the ACM and on the peripheral console, correct?
02:04 A. Correct.
02:04 Q. And you convert those and reconvert them to

get them across your XP Bus, correct?
A. Uh-huh.
Q. Now, you talked a fair amount about the PCI local bus. It was the parallel one, right?
A. Correct. Uh-huh.
Q. Yeah. USB was serial, correct?
A. It was.
Q. Yeah. And it was using differential signaling, correct?
A. Yes.
Q. And that preexisted your invention by multiple years, correct?
A. The serial part of it, yes.
Q. And the differential signaling part of it?
A. That part of it, I think that was later for USB 2.0.
Q. How long has differential signaling been around, Dr. Chu?
A. I can't answer that. It has been there a long time. Yes.
Q. Long time. Like, 50, 60, maybe even 70 years, right?
A. Okay. Yes.
Q. So nothing new about differential signaling?
A. What I referred to is USB 2.0 uses low-voltage

02:06 differential signal. 1.0 uses high-voltage.
02:06 Q. Okay. Now, in this white paper --
02:06 MR. BURESH: If we could back up to
02:06 Figure 4, please.
02:06 BY MR. BURESH:
02:06 Q. This is a slightly more detailed depiction of
02:06 your attached computer module, correct?
02:06 A. Yes.
02:06 Q. We're still seeing our peripheral buses, the
02:06 PCI to USB, et cetera. We're still seeing the host
02:06 interface controller, correct?
02:06 A. Correct. Uh-huh.
02:06 Q. But now you have a lot more stuff in this
02:06 particular figure, correct?
02:06 A. Yes. Uh-huh.
02:06 Q. Okay. So we have a separate host interface
02:07 controller. There's something called a south bridge.
02:07 There's a north bridge, graphics accelerator, CPU.
02:07 There's all those components that are the guts
02:07 of the computer system, correct?
02:07 A. Correct.
02:07 Q. Now, in your white paper --
02:07 MR. BURESH: If we can go to Page 7,
02:07 please. 22-7.
02:07 Thank you.

02:07 BY MR. BURESH:

02:07 Q. Here you talk about: The continuous drive towards chip integration can merge individual devices within the ACM.

02:07 Do you see that?

02:07 A. Yes.

02:07 Q. The host interface controller can be successively integrated with more and more of the rest of the system devices, correct?

02:07 A. Correct.

02:07 Q. Now, integration is just talking about taking two things and merging it into one?

02:07 A. Yes. Uh-huh.

02:07 Q. Okay. Or taking four things and merging them into three. That would be a form of integration?

02:07 A. It's extending it, but it's true also, a form of integration.

02:08 Q. Four down to one, now that'd be an integration?

02:08 A. I would call that a reduction. Four to one is an integration. Yes.

02:08 Q. Okay. Now, it says here: A small step in integration is combining south bridge and host interface controller.

02:08 Do you see that?

A. Yes.
MR. BURESH: Can we go to Figure 12 of the J-22, please?
BY MR. BURESH:
Q. So this is another depiction of your invention, correct?
A. Correct. Uh-huh.
Q. And in this one, you've brought the integrated south bridge and the host interface controller into one box, right?
A. Right. Uh-huh.
Q. That's a small step in integration?
A. Yes.
MR. BURESH: If we go to Figure 13.
BY MR. BURESH:
Q. Now we'll see another step of integration because here we've combined the CPU with the north bridge and the graphics accelerator, right?
A. That's a separate integration. Yes.
Q. And then you still have the same south bridge and host interface integration as well, correct?
A. Yeah. In this embodiment, yes.
Q. Okay.
MR. BURESH: Now, if we go to 13, Figure 13 -- I'm sorry. Let's go to Figure 14 since

02:09 we're already on 13.
BY MR. BURESH:
02:09 Q. Figure 14, still from J-22, now we see what
02:09 you call the biggest step of integration, which is to
02:09 bring all of that into one box. Integrated CPU, core
02:09 logic, graphics accelerator, and the interface
02:09 controller, correct?
02:09 A. Yes. Uh-huh.
02:09 Q. Now, just to be clear, the core logic there
02:09 was what was previously called the north bridge and the
02:09 south bridge?
02:09 A. Yes.
02:10 MR. BURESH: If we could go back to
02:10 Page 7 now.
02:10 BY MR. BURESH:
02:10 Q. In the final sentence you say: These advances
02:10 in integration do not change the fundamental invention
02:10 of repartitioning of a personal computer system into
02:10 ACM and a peripheral console.
02:10 Correct?
02:10 A. Yes. That's what I said. Uh-huh.
02:10 Q. So the various integrations we've just talked
02:10 about, they don't change the fundamental concept of
02:10 your invention, correct?
02:10 A. What this implies, I believe, is talking about

02:10 a modular aspect of the invention, about integrating a different function together inside ACM. It doesn't change the modular form factor invention that I was referring to here.

02:10 Q. Yeah. That's right. Thank you.

02:10 MR. BURESH: Okay. If we could go to Exhibit J-23 now.

02:11 BY MR. BURESH:

02:11 Q. This, I believe, is your third white paper, the January 15, 1998 white paper?

02:11 A. Yes. It is.

02:11 Q. And in this paper, you're talking about two separate PCI or PCI-like buses bridged by a pair of interface devices through a high-speed bus, correct?

02:11 A. Correct.

02:11 Q. So we're seeing the bridging concept that we talked about earlier in this white paper as well?

02:11 A. Yes. Uh-huh.

02:11 MR. BURESH: Could we go to the summary on Page 4, please?

02:11 Back up one page. Or just find the summary.

02:11 BY MR. BURESH:

02:12 Q. I'll come back to that because as I said in opening, when we're lost, it's usually just me. And

I'm lost at this point. So I'm going to go on to the next exhibit.

MR. BURESH: If we could go to Joint Exhibit 35, please. Next page.

Okay. If you could zoom in on the provisional number up at the top, please.

BY MR. BURESH:

Q. Dr. Chu, what are we looking at here?

A. I think we saw this before. It was an application by my patent attorneys to submit this invention on May 1st, 1998.

Q. So this was the provisional application filed on May 1st, 1998; is that correct?

A. Correct. Yeah.

Q. Okay. Now, in the '886 provisional patent application from May 1st, 1998, you described the XP Bus in the same way that we just looked at in your white papers; is that fair to say?

A. I believe after I wrote my white paper, I continued to supply some of the engineering drawings and such, and then I think some of them was incorporated into the provisional.

So the provisional includes part of the white paper or -- not all of it, of course, but it also includes additional disclosure I gave to the patent

attorney to put in there.

Q. Okay. Let me be more specific with my question.

MR. BURESH: If we could go to J-35-10. First paragraph.

BY MR. BURESH:

Q. Now, we've seen this paragraph previously from one of the white papers, correct?

A. Yes. Uh-huh.

Q. And here you're describing again your XP Bus as a cross peripheral bus, correct?

A. Yes.

Q. And you're referring to it as a peripheral bridge bus in your patent filing, correct?

A. Yes. Uh-huh.

Q. If we go to Figure 1 of your provisional, '886 provisional.

You see the same figure describing your desktop peripheral console with an ACM, correct?

A. Correct. Yes.

MR. BURESH: If we go to Figure 3.

BY MR. BURESH:

Q. We will see the same portable peripheral console with an ACM, correct?

A. Correct. Uh-huh.

MR. BURESH: Okay. If we go to Figure 6 on J-35-16.

BY MR. BURESH:

Q. This is the same depiction of the host interface controller with all the peripheral buses coming into it, correct?

A. Yes. Attorney took my white paper diagrams on here.

MR. BURESH: Okay. Go to Figure 11, please.

BY MR. BURESH:

Q. Now, Figure 11 of the provisional patent application adds in the peripheral console, correct?

A. Correct. Uh-huh.

MR. BURESH: If we could back up to Figures -- start with Figure 7, please.

BY MR. BURESH:

Q. We're also going to see the same stages of potential integration, correct, in Figure 7?

A. Correct.

MR. BURESH: And turn to Figure 8.

BY MR. BURESH:

Q. This is the middle level of integration?

A. Correct.

MR. BURESH: If we go to Figure 9.

BY MR. BURESH:

Q. This is the biggest level of integration that you depicted, correct?

A. Yes. Uh-huh.

Q. Same as in the white papers?

A. Correct.

Q. Now, this '886 provisional patent application that we're looking at here, it's fully incorporated in the asserted patents, correct?

A. Yes. Uh-huh.

Q. That means that the full contents of this provisional application are explicitly contained in each of the asserted patents?

A. Yes. Uh-huh.

MR. BURESH: If we could turn to J-1, please, which is the '786 patent.

BY MR. BURESH:

Q. That's one of the patents you're asserting in this case, correct?

A. Correct.

Q. And in these asserted -- in this asserted patent, the '768 patent, we're going to find the same bridging concept for the XP Bus that we've been talking about; is that correct?

A. Yes. Uh-huh.

02:16 MR. BURESH: Okay. If we could turn to Column 5, Lines 19 through 21.

02:17 BY MR. BURESH:

02:17 Q. Okay. There's a little more highlighting than I need here, but if we go down to Line 19, do you see that, Dr. Chu?

02:17 A. Yes.

02:17 Q. It says: The present invention encompasses an apparatus for bridging a first computer interface bus and a second computer interface bus.

02:17 Do you see that?

02:17 A. I do. Uh-huh.

02:17 Q. Do you agree that that's the present invention in the '768 patent?

02:17 A. You -- the present invention is what that says. Yes. Uh-huh.

02:18 Q. Okay. Now, if we go down to -- this is just talking about an apparatus for bridging.

02:18 MR. BURESH: If we go down to Line 25, please. 26. Thank you.

02:18 BY MR. BURESH:

02:18 Q. The apparatus comprises an interface channel.

02:18 Do you see that?

02:18 A. Uh-huh.

02:18 MR. BURESH: Now, if we go to Column 15,

Line 65, and on to Column 16, please. One more line, please.

BY MR. BURESH:

Q. So previously, we saw that the apparatus that was doing the bridging was called an interface channel, and here we're seeing that the XP Bus is referred to herein as an interface channel.

Do you see that?

A. Yes. Uh-huh.

Q. So bringing that all together, the XP Bus described in this '768 patent is bridging two other buses, correct?

A. Can you restate your question?

Q. Sure.

In the '768 patent, the XP Bus is serving the function of bridging two other peripheral buses; isn't that correct?

A. In this particular sentence, it doesn't say that. But I thought you were referring to the previous --

Q. The previous two sections we've looked at?

A. Yes. That's one of its use. Yes.

Q. Okay. Thank you.

You also repeated some of the figures from the '886 provisional patent into this '768 patent; isn't

02:20 that correct?
02:20 A. Yes. Uh-huh.
02:20 MR. BURESH: If we could go to, for
02:20 example, Figure 8A of the '768 patent.
BY MR. BURESH:
02:20 Q. Okay. Now, this is the same Figure 8 that we
02:20 saw on the provisional patent application, correct?
02:21 A. Yes. Uh-huh.
02:21 MR. BURESH: Okay. If we look at
02:21 Figure 8B in the '768 patent.
BY MR. BURESH:
02:21 Q. Now, this is the same as Figure 9 that we saw
02:21 in the provisional application, correct?
02:21 A. Yes.
02:21 Q. Now, if we focus on the '768 patent, which is
02:21 on the left-hand side of your screen, the caption of
02:21 that figure says: Attached computer module with single
02:21 chip fully integrated: CPU, cache, core logic,
02:21 graphics controller, and interface controller, correct?
02:21 A. Correct.
02:21 Q. That's the same language as the caption of
02:21 Figure 9 in the '886 provisional, correct?
02:21 A. Yeah. It has to be the same.
02:21 Q. Okay. Now, if we go to Column 8 of the '768
02:21 patent, and this is at Lines 24 to 26, it looks like.

Here it uses the exact same caption language to describe Figure 8B, correct?

A. Correct.

Q. And if we go to Column 16, Lines 29 to 31, we see the exact same caption language for Figure 8B again, correct?

A. Correct.

Q. And repeating that caption once in the figures and twice in the written description is the only discussion in this patent relating to this integrated chip scenario in the entire '768 patent, correct?

A. If you say so, yes. Uh-huh.

Q. You don't know of anything different?

A. Probably not. Uh-huh.

Q. And you'll agree with me that this is not a very detailed description of the integrated chip; is that fair?

A. Which integrated chip?

Q. This one depicted in Figure 8B.

A. Yes. It's not a detailed description.

MR. BURESH: Could we go back to Figure 5 of the first white paper, J-22?

BY MR. BURESH:

Q. During your direct, you said that your -- the second part of your invention was this LVDS concept,

right?

A. Yes. Uh-huh.

Q. So you had the modular computer on the one hand and the LVDS interface on the -- as a second part?

A. Yes.

Q. Okay. And your XP Bus that we've been talking about for the last 20 minutes or so, that's based on LVDS technology, correct?

A. Yes. Correct.

Q. You didn't invent LVDS technology, did you?

A. I did not.

Q. At the time of your invention, LVDS technology was already a well-known technology that was being used and promoted by a company called National Semiconductor; isn't that correct?

A. Yes. They sold a chip for that. Yes.

Q. Yes. Right. It's commercially available.

You could buy LVDS chips off the shelf, right?

A. Right.

Q. And you learned about LVDS technology during the approximately three weeks that you were writing white papers for your invention, correct?

A. Yes.

Q. In fact, you cited a National Semiconductor owner's manual in one of your white papers as a

02:24 reference, correct?
02:24 A. Correct.
02:24 MR. BURESH: Could you pull up D-950,
02:24 please?
02:24 BY MR. BURESH:
02:25 Q. Do you recognize this document, Dr. Chu?
02:25 A. I think so. Yes.
02:25 Q. What is it?
02:25 A. It's a National Semiconductor document. It
02:25 says: Design Guide. So it talks about LVDS.
02:25 MR. BURESH: Your Honor, I move to admit
02:25 D-950 into evidence.
02:25 MR. COLLARD: No objection.
02:25 THE COURT: It'll come into evidence.
02:25 BY MR. BURESH:
02:25 Q. All right. And, Dr. Chu, Exhibit D-950 is
02:25 titled an LVDS Owner's Manual, correct?
02:25 A. Yes. Uh-huh.
02:25 Q. Dated spring of 1997?
02:26 A. Yes.
02:26 Q. And just so we're keeping our time frame in
02:26 order, spring of 1997 was before you started your work
02:26 in Christmas of -- actually, Christmas of 1997,
02:26 correct?
02:26 A. Yes.

02:26 Q. I had to get it straight in my mind.
02:26 A. Yes.
02:26 Q. Okay. But this came before?
02:26 A. Yes. Uh-huh.
02:26 Q. And you were in possession of this LVDS owner's manual when you were writing your white papers?
02:26 A. I think so.
02:26 Q. In fact, you principally gained your knowledge of LVDS from this owner's manual, correct?
02:26 A. That's probably one of the documents. Yes.
02:26 Q. I'm sorry?
02:26 A. That's one of the documents. Yes.
02:26 Q. Now, the image on the front of the LVDS owner's manual from National Semiconductor shows something called TTL data being merged onto LVDS channels, correct?
02:27 A. Yes. Uh-huh.
02:27 Q. And then on the other side, that data's being converted back out to TTL, correct?
02:27 A. Correct.
02:27 Q. So they're taking in TTL data, converting it into a LVDS channel, and reconverting it, correct?
02:27 A. Correct. Uh-huh.
02:27 MR. BURESH: If we could go to Page 5 of this document, please.

02:27 BY MR. BURESH:
02:27 Q. Now, these LVDS --
02:27 MR. BURESH: If we could blow up the
02:27 "Save Money Too" section.
02:28 Thank you.
02:28 BY MR. BURESH:
02:28 Q. Now, this LVDS owner's manual is describing
02:28 its LVDS technology, and one of the things it says on
02:28 No. 2 there is high performance, correct?
02:28 A. Yes.
02:28 Q. That would mean faster in the computer space?
02:28 A. Yeah. Uh-huh. Of course.
02:28 Q. Yeah. So LVDS is -- National's LVDS
02:28 technology provided for faster data transfer, correct?
02:28 A. Yes.
02:28 Q. No. 3: LVDS consumes very little power,
02:28 correct?
02:28 A. Yes.
02:28 Q. So lower power consumption was a benefit of
02:28 National's LVDS technology, correct?
02:28 A. Yes.
02:28 Q. Let's go to No. 4. Low noise was another
02:28 benefit of National's LVDS technology, correct?
02:28 A. Correct.
02:28 Q. And those are the same benefits you described

02:29 during your opening testimony, correct?
02:29 A. Correct.
02:29 Q. So the benefits of your invention are the very same benefits that were provided by a technology that was put out by another company, National, called LVDS technology.
02:29 Same exact benefits, right?
02:29 A. I think your statement is wrong. I believe I never said I invented LVDS.
02:29 MR. BURESH: Could we go to the top of Page 6, please?
BY MR. BURESH:
02:29 Q. Here, we have another depiction of National's LVDS chip technology, correct?
02:29 A. Correct.
02:29 Q. And again, it's TTL on the left, but we see that it has 21 or 28 channels, correct?
02:29 A. Yes.
02:29 Q. And then that is merged down to four or five LVDS channels, correct?
02:30 A. Correct.
02:30 Q. And then it is back to 21 to 28 channels on the other side, right?
02:30 A. Correct.
02:30 Q. So National's LVDS chips would be more cable

friendly because they require less wires, right?
A. Yes.
Q. So that benefit of your invention was described by National as well, correct?
A. Again, that's common to any interconnect that uses LVDS technology. Correct.
Q. And anybody that was using National's LVDS chips would enjoy that benefit, right?
A. Correct.
Q. Now, if we look at this figure from the National owner's manual, it's got data going in one direction, right, which is that arrow in between?
A. Yes. Uh-huh.
Q. But it was well-known that if you wanted to go in both directions, you just buy a second set of chips and send the data the other way, right?
A. Yeah. That's, of course, correct. Uh-huh.
Q. And you'd have unidirectional data, right?
A. Yes.
Q. So National's LVDS technology also provided for unidirectional data transfer, didn't it?
A. Yes. Of course. You can use it for that in that fashion. Yes.
Q. So you weren't the first to come up with the idea of using what National called LVDS. Having two

02:31 unidirectional data channels to transmit data in
02:31 opposite directions, that wasn't your invention either?
02:31 A. That is not my invention.
02:31 MR. BURESH: Could we go back to J-22,
02:31 Figure 5?
02:31 BY MR. BURESH:
02:32 Q. Now, you actually tried to build a chip for
02:32 the host interface controller to connect your XP Bus
02:32 up, correct?
02:32 A. Yes. Uh-huh.
02:32 Q. And that interface controller, you intended it
02:32 to practice your invention, correct?
02:32 A. Yes.
02:32 Q. The idea of the chip you tried to build -- the
02:32 one you tried to build would have PCI local bus on one
02:32 side and XP Bus or LVDS on the other, correct?
02:32 A. Yes.
02:32 Q. I believe you hired four engineers to help you
02:32 build your chip?
02:32 A. Two and a half for the chip.
02:32 Q. You ever tell me previously it was four?
02:32 A. Did I tell you previously it was four?
02:32 Well, I guess I count myself as an engineer.
02:33 I was part of the design.
02:33 Q. So you would make three and a half?

A. Well, I say half because one of them was a consultant, was not full time.
Q. So somewhere -- two and a half, three, you hired some engineers to help you build this chip, correct?
A. Sure. Sure.
Q. And they worked on it for over a year?
A. Over a year. Uh-huh.
Q. After your design work on your chip, you sent the design off to a chip fabricator to help you build the chip, correct?
A. Correct.
Q. And I believe you have some of the results remaining back. It was the wafer you were showing us?
A. Yes.
Q. And there's nothing on that wafer that works, right?
A. Yes.
Q. Have you just kept them as a memento?
A. It's something that we spent a lot of time on. I keep it for memento. Yeah. I can say that.
Q. And so once you got the mementos back from TSMC, they did not work, just to be clear, correct?
A. Yes. I said that. Yes.
Q. There were no working signals, correct?

02:34 A. Correct.
02:34 Q. And you didn't know why it wasn't working?
02:34 A. We could not debug it properly. Yes.
02:34 Q. I'm sorry? You said --
02:34 A. We could not -- we don't have the capability to debug it properly.
02:34 Q. So you didn't know why it wasn't working?
02:34 A. Okay. We did not.
02:34 MR. BURESH: Mr. Palisoul, could you pull up D-1625, please?
02:34 BY MR. BURESH:
02:34 Q. Dr. Chu, do you recognize this document?
02:34 A. Yes. I do.
02:34 Q. Okay. And what is it?
02:35 A. It's a presentation presented for the board meeting on July 26, 2000.
02:35 Q. Okay. And this was a board meeting that you gave to -- on behalf of ACQIS, correct?
02:35 A. Oh, yes. Of course. Uh-huh.
02:35 MR. BURESH: Your Honor, I would move D-1625 into evidence.
02:35 MR. COLLARD: No objection.
02:35 THE COURT: Admitted.
02:35 MR. BURESH: If we could go to Slide 6, please.

BY MR. BURESH:

Q. So here you were in a board meeting, you were describing that the ASIC development would be discontinued, correct?

A. Yes.

Q. And just to be clear, the ASIC was another name for your interface controller, correct?

A. Correct.

Q. Now, you told the board that the ASIC, your invention, is "inefficient in power and performance."

Do you see that?

A. Yes.

Q. You mentioned below that bullet point that the ASIC had "long PCI latency delay," correct?

A. Yes. I did.

Q. You believe that your interface controller chip, your design of it, would actually cause delay in the transmission, correct?

A. It would cause delay. Yes.

Q. Because any time you introduce a device that's doing conversions between two buses, you're going to increase latency or delay, aren't you?

A. Yes.

Q. Now, you didn't say anything about here that you didn't have money to continue your development.

That wasn't what you told the board of directors, correct?
A. It's not on this slide, but certainly they know.
Q. But it's not on this slide?
A. Well, but it's part of the presentation.
Q. You're talking about technical problems, aren't you?
A. Here, yes. Of course. Uh-huh.
Q. Now, you never went back and tried to figure out how to get your chip for your XP Bus working; isn't that correct?
A. We didn't have the funding I mentioned.
Q. I mean, at no time in the future. We've seen some big numbers floating around about settlements you've taken.
You never went back and tried to get it to work even after you had money, did you?
A. You're talking about a huge time difference. This was in 2000.
Q. I'm just asking a question.
You never went back and tried to get your XP Bus to work, did you?
A. At that point in time, there was industry standard. It was not for me to actually change that

anymore.

Q. So the answer is no. You didn't try to get your XP Bus to work ever at any point in the future, correct?

A. I did not.

Q. In fact, in these devices we have here, you removed the XP Bus entirely, correct?

A. Yes. I said that. Uh-huh.

Q. And the only time you got your modular system to work in a way that you could sell it was when you did not include your LVDS channel idea, correct?

A. Correct.

Q. Now, we've talked about PCI some.

You remember there was also the USB peripheral bus on Figure 5 --

A. Yes.

Q. -- of J-22.

A. There was.

Q. Now, you never even tried to build a chip that would communicate USB over your XP Bus; is that right?

A. That's right.

Q. Never even attempted it?

A. No.

Q. In fact, you didn't even actually think about how to design or implement carrying USB over your XP

02:39 Bus. You never even thought about the design of that, did you?

02:39 A. How can you say that? It's in my description of the patent.

02:39 Q. I'll ask you the question again.

02:39 You didn't think about how to design and how to implement sending USB over the LVDS bus, correct? That's my question.

02:39 A. Say it again, please.

02:39 Q. You did not think about how to design and how to implement sending USB over the LVDS bus; is that correct?

02:39 A. I did not go and study the USB specification and try to do a design to convert -- in those days would be the USB 2.0 or 1.0 -- and put it through my bus. But what I did respond I had just now, I have shown in my patent description to say those are slow buses. So if you need to do that, you can pass it through the XP Bus.

02:40 MR. BURESH: All right. Let's pull up June 8th, 2022 transcript.

02:40 BY MR. BURESH:

02:40 Q. Were you -- excuse me.

02:40 Were you deposed in a proceeding on June 8th?

02:40 A. Yes. Of course. Uh-huh.

02:40 MR. BURESH: Sorry. It's June 8th, 2022.

02:41 BY MR. BURESH:

02:41 Q. Can you see the deposition on the screen in front of you, Dr. Chu?

02:41 A. Yes.

02:41 Q. Were you deposed on June 8th, 2022?

02:41 A. Yes.

02:41 MR. BURESH: Okay. If we could go to Page 75, starting at Line 7, please.

02:41 Page 75.

02:41 BY MR. BURESH:

02:41 Q. I'm going to give you a second to review this portion of your transcript, Dr. Chu, and then I'm going to ask you the question again. All right?

02:41 A. Sure. Uh-huh.

02:41 Q. You didn't think about how to design and how to implement sending USB over the LVDS bus, correct?

02:42 MR. COLLARD: Objection, Your Honor, to improper impeachment. He actually gave an answer that's close to what was the answer here.

02:42 MR. BURESH: It's not even in the ballpark.

02:42 THE COURT: Could I hear the question again?

02:42 MR. BURESH: Yes.

BY MR. BURESH:

02:42 Q. You didn't think about how to design and how to implement sending USB over the LVDS bus, correct?

02:42 THE COURT: And your objection is?

02:42 MR. COLLARD: Improper impeachment.

02:42 THE COURT: Overruled.

02:42 BY MR. BURESH:

02:42 Q. Can you answer the question?

02:42 A. Yes. If you look at the answer, I said -- I said it's possible. I did not think about the design.

02:42 What I mean by that --

02:42 Q. And I don't need an explanation.

02:42 THE COURT: He just asked you to respond to the question.

02:42 THE WITNESS: Oh, okay.

02:42 THE COURT: You may continue.

02:42 BY MR. BURESH:

02:42 Q. You didn't figure out how to actually go and do it, correct?

02:42 A. Correct.

02:42 Q. You didn't do the design work for USB, correct?

02:42 A. The design work for the USB circuitry. Correct.

02:43 Q. All you said was it's possible?

02:43 A. It's possible to send through the XP Bus. Yes.
02:43 Q. So to summarize --
02:43 MR. BURESH: You can go back to the exhibit now.
02:43 BY MR. BURESH:
02:43 Q. So to summarize, you could not get PCI local bus working over your XP Bus, correct?
02:43 A. Correct.
02:43 Q. You didn't try to implement your XP Bus with USB, correct?
02:43 A. Correct.
02:43 Q. Now, sitting here today, I believe you testified that if you just tried hard enough, you'd get your XP Bus working or something to that effect, right?
02:43 A. Yes.
02:43 Q. But you can't say for sure that your XP Bus would even work, can you?
02:43 A. Why do you say that?
02:43 Q. Because actions speak louder than words.
02:43 You never got it working, did you?
02:43 A. I didn't have the time to prove my action.
02:43 Q. Now, after you went ahead and built your modular computer system with the PCI local bus as the connection, you did sell some, correct?

A. Yes.
Q. But you wouldn't consider that to be commercially successful, correct?
A. No.
Q. In fact, you didn't make enough money to keep your business going, correct?
A. Correct.
Q. Since 2004, you have not developed any products, correct?
A. Yes. We sold the hardware business.
Q. I'm sorry?
A. We sold the hardware business.
Q. So since 2004, you have not developed any products at all, correct?
A. Correct.
Q. And since 2004, you have not sold any products, correct?
A. Correct.
Q. So for about the past 20 years, ACQIS has not built or sold a single product, correct?
A. Correct.
Q. Now, once you stopped trying to build products in 2004, you shifted gears, right, with your business?
A. Yes. Yes.
Q. In fact, you changed your company name just

slightly, from LLC to Inc. or vice versa. I can't remember which way you went. You can tell me.
A. We did not change the company name.
Q. You didn't?
A. We had a subsidiary as LLC.
Q. Okay. And you focused on licensing, correct?
A. Correct.
Q. That was your full business going forward, was trying to license your patents?
A. Correct.
Q. Okay. Now, you showed us a lot of licenses, right?
A. Yes.
Q. Now, every one of those was really a settlement agreement; isn't that correct?
A. What do you mean?
Q. I mean that every one of those that you showed us was a settlement agreement to resolve a lawsuit that you brought; isn't that correct?
A. You used the term "settlement agreement."
Q. Uh-huh.
MR. COLLARD: Objection, Your Honor. Can we approach?
THE COURT: Sure.
(Bench conference.)

02:46 MR. COLLARD: Your Honor, it seems to be going right up to your motion in limine talking about litigations. We avoided that on our direct. We avoided opening the door to that issue, and now he's asking him about them all being from litigation.

02:46 THE COURT: I think he's just trying to make the point of how they arrived at these.

MR. COLLARD: Correct.

02:46 THE COURT: And you're correct that all of them were a result of either respect to litigation or --

02:46 MR. COLLARD: They were all the result of litigation. Every single one.

02:46 THE COURT: That's just a fact.

02:46 MR. COLLARD: Okay. Thank you.

02:46 (Bench conference concludes.)

02:46 BY MR. BURESH:

02:46 Q. Every single agreement that you entered with all those companies we saw on the screen, they were the settlement of a lawsuit that you brought, correct?

02:47 A. Correct.

02:47 Q. So in the 20 years that you've been trying to license your patents, there's never been a single company that's come to you and said, oh, Dr. Chu. We really love your idea for an X bus. Can we use your

02:47 technology?

02:47 Never been one of those, right?

02:47 A. Nobody wants to talk to us. Yes.

02:47 Q. So you've sued a lot of companies, correct?

02:47 A. Correct.

02:47 Q. And many of those companies that you've sued
02:47 have settled, correct?

02:47 A. You just said that. Yes.

02:47 Q. So it's correct?

02:47 A. Correct.

02:47 Q. It's a fact, isn't it, that when you sue
02:47 companies, many will enter a settlement agreement just
02:47 to avoid the time and expense of the litigation without
02:48 any admission of liability or fault. Isn't that a
02:48 fact?

02:48 MR. COLLARD: Objection. Foundation,
02:48 Your Honor.

02:48 THE COURT: Overruled.

02:48 A. I cannot speak to what the other companies are
02:48 thinking of when they license our patents. There are
02:48 small amounts and there are large amounts. It is not
02:48 for me to say whether it's because of legal costs or
02:48 other reason.

02:48 MR. BURESH: Okay. Let's pull up Joint
02:48 Exhibit 52, which has been previously admitted.

Did you publish that already? Thank you.

Could you zoom in on the first "whereas" clause, Mr. Palisoul?

BY MR. BURESH:

Q. So it's not for you to say why companies settle.

Is that your answer previously?

A. Yes. It's the other party's decision.

Q. But you actually say in some of your settlement agreements that the parties are currently engaged in the litigation, and to avoid the time and expense of the litigation and without any admission of liability or fault, the parties desire to enter a full, final, complete, and global settlement, correct?

A. First of all, this is --

Q. Is that what the document says?

A. That's what the document said.

Q. And this is a settlement agreement, is it not?

A. But you have to understand who wrote this settlement agreement.

THE COURT: No, no, no, no. You answer his question.

THE WITNESS: Okay.

THE COURT: If your lawyer wants to have you explain it, he can.

02:50 A. Please ask the question again. Yep.
02:50 BY MR. BURESH:
02:50 Q. My question was: This is a settlement agreement, correct?
02:50 A. It's a patent licensing agreement. Correct.
02:50 Q. It is a settlement and license agreement, correct?
02:50 A. Yes. Both.
02:50 Q. Okay. And we're seeing here the desire of the parties is to end the litigation; isn't that correct?
02:50 A. Yes. It is. Uh-huh.
02:50 Q. Okay. That's what was said in this formal document, correct?
02:50 A. Correct.
02:50 MR. BURESH: Can we pull up P-925, please?
02:51 (Off-the-record discussion.)
02:51 BY MR. BURESH:
02:51 Q. Dr. Chu, you used this document in your direct testimony, correct?
02:51 A. Correct. Uh-huh.
02:51 Q. Now, every one of these companies on this slide in front of us offered modular computers for sale, correct?
02:51 A. Yes. That's the time when we had our first

02:51 activity on licensing.
02:51 Q. So every one of these companies is doing
02:51 modular computing?
02:51 A. Yes. That's because we had at that time only
02:52 modular computing patents.
02:52 Q. And my clients aren't doing modular computing,
02:52 right?
02:52 A. I don't think so.
02:52 Q. So we're not quite situated the same as these
02:52 companies; isn't that fair?
02:52 A. Well, you have to look at the time frame.
02:52 This is --
02:52 Q. I'm just saying, we're not doing modular
02:52 computing. They are. We're not situated the same way
02:52 as they are, correct?
02:52 A. We are not situated the way they are in 2010.
02:52 Yes.
02:52 MR. BURESH: Now, you can take this down
02:52 now.
02:52 BY MR. BURESH:
02:52 Q. When companies do pay settlement agreements or
02:52 enter settlement agreements with you, Dr. Chu, and they
02:52 pay some dollars to get out of their lawsuit, you take
02:52 a big chunk of that change, right?
02:52 A. Do you mean me myself?

02:52 Q. I mean you as your company. Yes.
02:52 A. As a company, of course we take a percentage of the settlement. Yes.
02:52 Q. And you're the largest shareholder of your company, right?
02:52 A. Yes. I am.
02:52 Q. So if these companies settle after you sue them, you stand to personally profit from every one of those, right?
02:53 A. As an aggregate, when we do have money remaining in the company, we certainly would distribute to our hundred shareholders, and I'm one of them. Yes.
02:53 Q. Now, let me ask -- I'll give you an open-ended one, okay? It won't have "correct" at the end.
02:53 Would you agree with me that it wouldn't be fair to take credit for things you don't invent?
02:53 A. Yes.
02:53 Q. Okay. I'm going to go through a few things here that are inside of my client's computers, all right?
02:53 You didn't invent a CPU?
02:53 A. No.
02:53 Q. You didn't invent a graphics processing subsystem, right?
02:53 A. No.

02:53 Q. So you shouldn't get credit for that?
02:53 A. It's for the damage expert to decide.
02:54 Q. I'm just -- you agree with me that you shouldn't get credit for what you don't invent. You've said you don't invent a graphics processing unit; ergo, you shouldn't get credit for the graphics processing unit, right?
02:54 A. If the graphics processing unit uses the bus I invented, certainly there would be credit.
02:54 Q. You didn't invent RAM, which is a type of memory, correct?
02:54 A. Correct.
02:54 Q. You didn't invent a hard drive for a computer, correct?
02:54 A. Correct.
02:54 Q. You didn't invent SSD memory or persistent memory, correct?
02:54 A. Correct.
02:54 Q. You didn't invent flash memory?
02:54 A. Correct.
02:54 Q. You didn't invent a circuit board, correct?
02:54 A. Correct.
02:54 Q. You didn't invent a battery, right?
02:54 A. Correct.
02:54 Q. You didn't invent a power supply for a

computer?

A. Correct.

Q. You didn't invent a new case for a computer, like the outer shell, correct?

A. Correct.

Q. So you wouldn't get credit for any of those things I just listed, correct?

MR. COLLARD: Your Honor, I object to vague as to credit. I'm not really sure what the question is.

THE COURT: Are you objecting, you think your witness doesn't know what "credit" means?

MR. COLLARD: Okay. I don't know if he knows in the context --

THE COURT: If he would like to ask what "credit" means, he can; otherwise, I'm going to overrule the objection.

A. If the computer system is using my invention, which is the bus I mentioned, and if the computer system would not work without that invention, then the question is: If you cannot sell the computer without that invention, then the -- then the computer -- the whole computer is going to be sold based on the invention.

So there would be credit if it's required for

02:55 my invention to work.
02:55 BY MR. BURESH:
02:55 Q. So you would get credit for a battery because it's sold, because you allege that they're using LVDS, that you should get credit for a battery.
02:56 Is that your testimony?
02:56 A. That's not what I'm saying.
02:56 Q. Okay.
02:56 A. If they -- can I continue on that?
02:56 Q. No. That's fine. Your attorney can take his time to ask you again if he'd like, all right?
02:56 You weren't involved in the development of PCI Express at all, correct?
02:56 A. No. I wasn't involved.
02:56 Q. Or USB -- any version of USB, you weren't involved in the development of that either?
02:56 A. I was not.
02:56 Q. Okay. You weren't even aware of PCI Express until it was publicly announced in 2003, correct?
02:56 A. Yes. Of course. Uh-huh.
02:56 Q. And PCI was -- PCI Express was in wide use after 2003, wasn't it?
02:56 A. If it become an industry standard, yes.
02:56 Q. It kind of took off like wild fire, right?
02:56 A. It took off. Yes.

02:56 Q. You aware that ASUSTeK was using PCI Express by 2004?
02:57 A. I don't think at 2004, but at a later date, yes.
02:57 Q. You've testified that you believe you've invented some aspects of PCI Express; is that fair?
02:57 A. Yes.
02:57 Q. Okay. And you realized that once you saw the announcement of PCI Express in 2003 or 2004?
02:57 A. Yes. Uh-huh.
02:57 Q. But you didn't go to ASUSTeK at that point and say, you might be infringing?
02:57 A. Remember what I said earlier, that --
02:57 Q. Did you go to ASUSTeK at that point and say, you might be infringing?
02:57 A. I did not have the patent to go to ASUSTeK at the time.
02:57 Q. Okay. It took you -- from the time PCI Express was released, it took you 14 years to send a letter to ASUSTeK, correct?
02:57 A. It took me only two years after I have the asserted patents to go tell ASUSTeK.
02:58 Q. You had 30 patents, right?
02:58 A. Not all patents would apply to ASUSTeK.
02:58 Q. Okay. Now, let me just ask you this: If

someone trespassed on your property, like the barbed wire fence that we saw during your counsel's opening, they cut your fence down, would you go immediately as soon as you learned about it and say something?

A. "Immediate" is a relative term. We have to gather the proper resource and situation to really take a company -- basically to file a suit against a company or...

So it is not a simple process of if I know somebody, I would right away be able to notify that company.

Q. It sounded pretty easy during your direct. You just looked up on the Internet and it said that ASUSTeK was using PCI Express, boom.

A. Yes.

Q. Pretty easy, right?

A. Given the resources we had, the most important thing is for our company or myself to send a letter to notify ASUSTeK, hoping that they would talk to us. So that is really the start of the damage in terms of patent -- violating our patent rights.

Q. So on -- the letter you sent was on May 15th of 2018, correct?

A. Correct.

Q. That was one year before your patents started

expiring, correct?

A. Yes.

Q. To the day?

A. I guess.

Q. Yeah.

But that timing, that pending expiration of your patents didn't have anything to do with why you sent them a letter?

A. No.

Q. Okay. It just happened to be on the one-year pre-anniversary?

A. I didn't even consider that.

Q. Okay. "Expired" means your patents are running out of life, correct?

A. "Expired" means any product that's built after that date, you have no rights to.

Q. Because you get 20 years of patent life, right?

A. Correct.

Q. And you did your invention back in 1998, 1999, right?

A. Yes.

Q. So your 20 years was up?

A. Correct.

Q. Sitting here today, your 20 years has been up

03:00 for a while now, right?

03:00 A. Yes.

03:00 Q. Now, you testified that ASUSTeK didn't respond to your letter, correct?

03:00 A. Yes.

03:00 Q. You have no idea whether anyone at ASUSTeK ever read your letter, do you?

03:00 A. No idea.

03:00 Q. You never followed up with them with another letter or an e-mail?

03:00 A. I did not.

03:00 Q. You didn't pick up the phone and try to call somebody?

03:00 A. I did not.

03:00 Q. In your letter, you never told them, I think you're infringing, did you?

03:00 A. I think I did.

03:00 Q. You didn't use those words?

03:01 A. It's just a word.

03:01 Q. It's a word. And I'm asking, did you say that word in your letter?

03:01 A. I did not say that word for ASUSTeK.

03:01 Q. You didn't tell them to stop using PCI Express or USB 3, did you?

03:01 A. I just asked them to talk to us.

03:01 Q. You never told them you were going to sue them, right?
03:01 A. If I don't say they infringe, of course I haven't said that I would sue them. Yes.
03:01 Q. After your letter in May of 2018, you waited for two more years before you filed a lawsuit, correct?
03:01 A. Correct.
03:01 Q. You waited until after your patents expired to file your lawsuit, correct?
03:01 A. I didn't wait for anything. It was -- it takes time for us to collect the resource to file the lawsuit.
03:01 Q. What's the filing fee to file a lawsuit in this court? Do you know?
03:01 A. Could you say that again?
03:02 Q. What's the filing fee to file a lawsuit in this court? Do you know?
03:02 A. It's -- I'm not talking about that.
03:02 Q. Oh. Because it's like, what, 150 bucks?
03:02 A. As I said, I'm not talking about that.
03:02 MR. BURESH: Pass the witness, Your Honor.

03:02 REDIRECT EXAMINATION

03:02 BY MR. COLLARD:
03:02 Q. Good afternoon, Dr. Chu.

A. Good afternoon.

Q. Let's just start right where you left off. You said that you weren't talking about the filing fee of a lawsuit when you were saying that. You had to -- that -- when you were talking about the cost to file a lawsuit, what were you talking about?

A. To be able to have maybe the guts or the financial resource to file a lawsuit, even before you go to court, it costs a lot of money. It costs what we call out-of-pocket expense. It costs legal fees. Because you have to go through depositions, testimony, discovery. So it's a very expensive process. So we don't take it lightly.

And what I meant was when I sent out the letter in 2018, I sent out to 18 companies, not just ASUSTeK. That's just one of them. And it took me a long time to find a partnership in a law firm to be able to say, okay. I'm willing to handle your case. In fact, it took me a lot of time to find the financing for it.

And two years is really not that long because we filed -- at the same time when we filed lawsuit against ASUSTeK, we already have filed three lawsuits before that. And together with ASUSTeK, we filed another four companies. It took a huge amount of

03:04 resource to do that. So --

03:04 Q. But, Dr. Chu, do you like to litigate, or do you want to avoid litigation?

03:04 A. We try to avoid litigation very much. As you see, in terms of settlements we got, we --

03:04 Q. So you looked at that Lenovo settlement for a little bit with Mr. Buresh.

03:04 Do you recall that?

03:04 A. Yes.

03:04 Q. Is -- does Lenovo make computers like ASUS? Do you know if they're a competitor of ASUS?

03:04 A. Lenovo is even -- is actually what you will see today as the IBM laptops. They bought the business. So they are actually very large in U.S.

03:04 Q. So do you know what they settled that case for?

03:04 A. They settled for, I believe, [redacted]

03:04 Q. Okay. Is that settlement -- you do know how much litigation costs.

03:04 Was that settlement, is that sort of just calculated to whatever the litigation costs would be, they would pay you that instead?

03:05 A. No. Even though coming to court costs a lot of money, typically the assumption is anywhere from 3 to $5 million. [redacted]

[redacted]

Q. Okay. Were the patents at issue in that settlement with Lenovo, were they similar to the patents that were at issue here?

A. Yes. They were.

Q. Okay. And did Lenovo have an opportunity in that -- in that case to evaluate the patents and get their own experts and do all sorts of litigation?

A. They actually challenged the patent in the Patent Office. Even ASUSTeK did.

Q. Let's --

MR. BURESH: Your Honor, move to strike that answer.

THE COURT: Why?

MR. BURESH: Because we don't get to talk about other proceedings like that.

THE COURT: Overruled.

BY MR. COLLARD:

Q. So even after doing all those things and having their own expert and challenging the patent, did they -- did Lenovo settle after doing those things?

A. Yes.

Q. Did -- of the other settlements on that demonstrative 920 or that Exhibit 920, did they do the same thing? They had the chance to look at the patents

and test them and get their own experts and their own evaluations before they settled?

A. Any large computer companies with the resource we're talking about, these are companies with billions of dollars in revenue. They certainly would look at the patent and try to challenge it. That's why I said our patent was being challenged many times. And --

Q. Okay. Oh, sorry. Go ahead.

A. And so they know. A company knows whether a patent has value. Otherwise, they would not pay for it. They are not certainly lack of money to fight.

Q. Dr. Chu, there's a lot of discussion about the modular aspects of your computer with Mr. Buresh.

Do you remember that discussion?

A. Yes.

Q. Okay. And I want to try to explain that a little more because I want to talk about a word that came up a little bit in the patent video but we haven't talked about.

Can you explain to the jury what an embodiment of your invention is, Dr. Chu?

A. An embodiment is just a description of one of the ways of using, in this case, the computer bus.

Q. Okay. And over the life of all of your patents, you said there were over 30.

03:07 Were there different embodiments in different patents and different claims?
03:07 A. Embodiment is just to tell the patent examiner this is one way you can do it. But what I would like to add is if you look at our claim, the claim can -- can claim that the bus has been used more than once in a computer system. Because once you have invented a bus, nothing really prevents you from using it more than once.
03:08 So please do not feel that because the description itself doesn't talk about the bus being used in two different places. I certainly, as an inventor, have a right to say this bus can be used in this situation. Plus in the same computer, I can use the bus in another situation.
03:08 Q. Let's -- Dr. Chu, let's try to let -- let's look at something specific. I want to look at the patent application you looked at -- or sorry -- the issued patent you looked at with Mr. Buresh.
03:08 A. Yes.
03:08 Q. So he compared some parts of the white papers with some parts of the patent application?
03:09 A. Yes.
03:09 Q. But does it sound right to you that J-23, the first white paper that you were looking at, it's about

03:09 16 pages? Does that seem about right?
03:09 A. Okay. Yes.
03:09 Q. And then your patent application, let's -- or sorry. Your issued patent '768 --
03:09 MR. COLLARD: Let's look at J-1.
BY MR. COLLARD:
03:09 Q. And I think that this is said to be two pages.
03:09 So was there more information in your patent than there was in the original white paper, even if some parts of the white paper made their way into the patent?
03:09 A. I mentioned that most of the invention that is contained --
03:09 Q. Sorry. Is that -- can you answer my question yes or --
A. Oh, sorry.
03:09 Q. Like, can you -- if you -- it's okay if you need to explain, but first, will you say yes or no?
03:09 A. Yes. Yes.
03:09 MR. COLLARD: Okay. So let's look at J-1, please.
03:09 Oh, I have to do my things.
03:09 This is admitted.
03:09 And I want to go -- let's start at Page 15 because I think we know that the prior art went

through the first 14 pages. And then we started having some of the figures.

So, Vicki, would you please flip through these pictures? Will you just flip a few pages ahead, please?

Can you please -- I'm not seeing them. If -- are you flipping a few pages ahead?

Okay. Thank you. And just keep going.

BY MR. COLLARD:

Q. So not all of these figures were in your white paper, were they, sir?

A. No. These are some of the design work I did after the white paper. So it's between January and May, I provided the patent attorney more detail design of my invention.

Q. Okay. Thank you.

MR. COLLARD: So we're up to about Figure 28. We can stop there. And let's go to Page 75.

Let's go to the last page then, and we'll work back. 72. Sorry. So I want to go back till we get to Claim 10. And then I want to blow up Claim 10 really big. It's on the left side.

BY MR. COLLARD:

Q. So Claim 10 is actually one of the asserted

03:11 claims in this case. And Mr. Buresh was asking you a lot of different questions about what you invented.

03:11 But for the purposes of this case, what describes your invention?

03:11 A. My invention in most of claims are described in actually a few sentence.

03:12 Q. So what I'm really trying to ask, Dr. Chu, is for the purposes of this case, do you need to prove that ASUS is doing what you said in a white paper, or do you need to prove that they are doing what is said in the claim?

03:12 A. In the claim.

03:12 Q. In the claim.

03:12 A. Yes.

03:12 Q. All right. So let's look at this claim. And it claims "a printed circuit board comprising."

03:12 Do you see that?

03:12 A. Yes.

03:12 Q. All right. Sir, you were talking a lot about some of the modular components.

03:12 Is there anything in this claim that requires bridging between something like a computer module and a bay like this?

03:12 A. No. No.

03:12 Q. There's nothing -- there's nothing like that

in this claim?
A. No.
Q. Okay. And so this claim's talking about a printed circuit board.
And did your modular computer, though, did it have a printed circuit board inside of it?
A. Yes.
Q. Do servers have printed circuit boards inside them?
A. Yes.
Q. What about laptops?
A. Yes.
Q. Desktops?
A. Yes.
Q. Phones?
A. Yes.
Q. Okay. So are you required in -- after you invent something and write about it in white papers, are you required for every claim to put in all the different parts that you invented? Every time you make a claim?
You have to put in the modular part. You have to put in the bus.
Do you have to put in everything, or can you have claims that are on parts of your invention?

03:13 A. You don't have to put in everything, of course. You only put in the primary invention.

03:14 Q. You talked a lot about integration, and you walked through the figures. And you said -- Mr. Buresh said to you, Dr. Chu, are you integrating these two things together and then these two things?

03:14 Do you remember that?

03:14 A. Yes.

03:14 Q. Okay. And then he said and showed you a sentence that said: That integration didn't change the modular aspect of your computer.

03:14 Do you remember that?

03:14 A. Yes.

03:14 Q. Did that integration change the computer bus aspect of your invention?

03:14 A. Yes. Because it uses my invention.

03:14 Q. Okay. You were asked a lot of questions about LVDS.

03:15 Do you recall that?

03:15 A. Yes.

03:15 Q. Did you mean for your invention to be the same thing as the LVDS in TTL technology from National?

03:15 A. Yeah. LVDS is the technology that I was using, and National Semiconductor was building two chips to do a special connection with TTL signals.

But the one I'm trying to use in the computer system is taking the PCI local bus, even though they are also TTL signals, but it's far more complicated than the TTL signal that's shown by National.

Q. Okay. And I want to go back to your early patents for a second.

When we were talking about how you're -- the patents you were choosing -- or you were choosing to assert.

A. Yes.

Q. What were your early patents directed to?

A. The early group of patents I mentioned earlier was -- has to have a modular computer. So every claim would start off with a modular computer module and console.

And so that was the first group of patents. That also probably came up to about 10 or 11.

Q. Okay. Just a couple more things, Dr. Chu.

Let's go back to the very first page of this document and the date on this. And we looked at this during your direct examination.

And the date on this patent is December 27, 2016, almost the very end of 2016.

And can you enforce a patent before this issued date?

A. No. I cannot. I don't have the patent rights.

Q. Okay. And did this patent expire -- or I don't know actually when this one expired, but around 2019 or 2020?

A. This one expired 2020.

Q. Okay. That's only four years.

Can you explain to the jury why this patent only had four years between when it issued and when it expired when they heard on the video that you usually get closer to 20 years?

And I think that that's something that Mr. Buresh may have said too.

A. I only had the right to be able to get a new patent on new claims that described -- that's described in this patent based on the invention that I had in 1998.

So because in this particular case, it was based on the patent I had in 20 -- sorry -- in 2000. So that was the patent. And I cannot change the content of what I have invented in any of these later patents. You have to -- the Patent Office will only allow you to claim things that was already in those disclosures way early.

So as I said, I was awarded 30 patents. So

sequentially, I was working on each one of them. This is one of the very late ones. So Patent Office allows it because it all relates to the invention I did prior to the 2000 time frame. But I only got four years left because this 20 years of lifetime.

Q. Okay. Thank you, Dr. Chu.

MR. COLLARD: Your Honor, I can be really brief, but can we approach? I think it would be the quickest way.

THE COURT: Sure.

(Bench conference.)

MR. COLLARD: Your Honor, sorry to go around on this again, but Mr. Buresh asked if he mentioned the word "infringe" in his letter. And he does, but it's in the redacted section.

MR. BURESH: It's what?

MR. COLLARD: It does. It says they were found liable for infringement. It says infringe.

THE COURT: He asked whether --

MR. BURESH: I asked whether --

(Simultaneous conversation.)

MR. COLLARD: Okay. Fine.

THE COURT: -- whether he accused the defendant of infringing.

MR. BURESH: That was my question.

MR. COLLARD: All right. Thank you.
(Bench conference concludes.)
BY MR. COLLARD:
Q. Just one last thing then, Dr. Chu.
Do you remember when you were asked about what words you used in your letter to ASUS that's Exhibit P-50?
Do you recall that?
A. Yes.
Q. In your view, when you wrote the letter, did you provide information to ASUS so that they could understand that they were infringing your patents?
A. I personally think that I provide all the information necessary for ASUS to determine whether they infringe, because they are, you know, in a multibillion dollar company. I told them what product that they potentially infringe. I told them the ten patents that I asked them to look at.
I make the job easier. I told them, look at PCI Express. Look at USB 3.0. Look at the CPU you're using, which is the Intel CPU.
So if they were serious about my letter, only take probably -- not very long time for the engineering people or their legal people to look at this and say, this is a serious thing.

Because, you know, I mean, if they ever take a letter seriously, they would know that it infringe, because I know 100 percent they infringe. But to not --

THE COURT: Why don't we move on to another question?

MR. COLLARD: That's all I have, Your Honor.

Thank you, Dr. Chu.

THE WITNESS: Okay. I'm done?

MR. BURESH: Nothing further, Your Honor.

THE COURT: Yes. You are done. He had to say that before I could answer.

THE WITNESS: Okay. Thank you.

THE COURT: Ladies and gentlemen of the jury, let's take our afternoon recess -- well, actually, your next witness is an expert?

MR. COLLARD: Yes, Your Honor.

THE COURT: Why don't you go ahead and get him proven up, and then we'll -- that will let you start with your direct.

MR. COLLARD: Okay. It'll be Mr. Hales.

MR. HALES: Plaintiff calls Dr. Nabil Sarhan.

(The witness was sworn.)

DIRECT EXAMINATION

BY MR. HALES:

Q. Dr. Sarhan, welcome.

Will you please introduce yourself to the Court and the jury?

A. Yeah. My name is Nabil Sarhan, and I'm an associate professor of electrical and computer engineering at Wayne State University in Detroit, Michigan.

Q. Dr. Sarhan, did you move to the United States from another country?

A. Yes.

Q. Which one?

A. From Jordan.

Q. Why did you move to the United States?

A. The United States is -- the United States is well-known for the best universities in the world. My brother who's 12 years older than me came to the United States before me for his Ph.D. at Virginia Tech.

Since I was 13, I realize that my best opportunity to learn and grow is to do the same. So I joined Penn State University, where I completed my master's and Ph.D. degrees in computer science and engineering.

Q. Thank you.

Are you a citizen of the United States?
A. Yes.
Q. Since what time?
A. 2011.
Q. Okay. And do you have a family here?
A. Yes.
Q. Will you tell us a little bit about them?
A. Yeah. I'm married with six kids, ages 2 to 14.
Q. Be sure to thank your wife for loaning you to us this week.
Dr. Sarhan, have you prepared some slides to support our discussion today?
A. Yes. As a professor, I try my best to explain things in the easiest way possible for the jury to understand.
Q. Are we looking at the title of the slide deck?
A. Yes.
Q. Okay. Would you please describe your educational background for the jury?
A. Yeah. I have a slide about that.
So I have -- I got my bachelor of science degree in electrical engineering, and then I got my master's and Ph.D. degrees in computer science and engineering from Pennsylvania State University.

I'm an associate professor of electrical and computer engineering at Wayne State University. I'm also the director of Wayne State computer systems and deep learning research lab. I'm also the director of the masters of science degree in artificial intelligence.

Q. What does one do to secure degrees in computer science and computer engineering?

A. Yeah. So basically, you need to have experience in both the hardware and software aspects. To get the Ph.D., you have to do a lot of research in the field.

Q. I see some of your study here is on deep learning.

Can you help the jury understand what deep learning is?

A. Yes. So deep learning is a way to achieve artificial intelligence. For example, like when you interact like with Siri, you ask questions to Siri. Basically, Siri uses the information that it learned previously in order to answer the question. So it was trained using deep learning techniques in order to learn these tasks that you ask her to do.

Q. Did you write a dissertation as part of your Ph.D.?

03:26 A. Yes.

03:26 Q. Will you please tell the jury about that dissertation?

03:26 A. Yeah. I basically investigated how to design large scale computer systems to support multimedia applications, including video streaming. I developed new solutions to support huge number of users at the same time.

03:26 Q. Can you give them a more, I guess, tactile understanding of what this is and whether it's in use today?

03:26 A. Yeah. So at that time, people questioned why would anyone watch a movie on the Internet? They have like best store. They have all these other store. They can just go to the store, rent a DVD. Why would anyone rather watching a movie over the Internet?

03:26 Now, of course we have Netflix, we have YouTube. We have all these online video streaming services.

03:27 Q. Great.

03:27 What did you do after your dissertation and graduation from your Ph.D. program?

03:27 A. I immediately joined Wayne State University as a faculty member.

03:27 Q. And what year was this?

A. 2003.

Q. Okay. In what department did you join Wayne State?

A. Electrical and computer engineering.

Q. Do you teach any courses at Wayne State?

A. Yeah. Sure. And I have a slide about that.

So I teach a variety of undergraduate and graduate courses in computer engineering. I teach computer architecture, advanced computer architecture, computer networking and network programming. I teach a scalable and secure Internet services and architectures, among other courses.

Q. Okay. I want to back up on that timeline just a little bit. The patents, as we've heard from Dr. Chu, were applied for in the kind of 1999/2000 frame.

Did you consider yourself at this time a person of ordinary skill in the field of computer science and computer engineering?

A. Yes.

Q. Why?

A. So I already finish a five-year bachelor of science degree in electrical engineering at that time. And then I, like, work in the industry for a little while, and then I joined a master degree program where

03:28 I, like -- like basically taught -- like, I learned all of -- took all the courses, and I almost done with my master thesis back in -- back in Jordan. And also, I sub as a teaching assistant, and I was supervising teaching labs there.

03:28 Q. Tell me about supervising and teaching in labs. What would that entail?

03:28 A. So basically, I was a teaching assistant, and part of my duty was to, like, teach -- teach -- be in control of the whole lab, to teach different labs in computer engineering.

03:28 Q. Okay. Let's return, I guess, in the timeline back to after you joined Wayne State.

03:28 What professional activities have you undertaken while being a professor there?

03:29 A. Yes. I have a slide about that.

03:29 I published more than 50 refereed research papers in computer science and engineering, including those in the top venues in the field. I have a patent -- a U.S. patent on Automated Video Surveillance Systems.

03:29 I served as a chair of almost 20 international accreditation panels for undergraduate programs and universities.

03:29 I also served as the chair of the Interest

Group on Media Streaming. This is one interest group within IEEE. And I served as associate editor of some fun, prestigious journal in the field.

Q. I want to revisit a couple of these.

What does it mean for a paper to be refereed?

A. "Refereed," it means like before it can be accepted, it has to be reviewed by peers. And then they will decide whether the quality of the paper is high enough and novel to be accepted or not.

Q. Can you provide the jury with a couple of examples of the types of areas of research you've engaged in?

A. Yeah. I have engaged in multiple research projects, and I have a slide that shows only two of them.

Basically, one of the -- like here, we can see in the slide here, like, basically, there are two projects that I worked on.

One of them is regard to -- is about the design of automated video surveillance systems for automatic detection of the threats, which will allocate resources dynamically in the best way possible to various cameras and video sources in such a way that it will optimize the threat detection accuracy without any human intervention.

03:30 And here I have a picture with the -- some of my Ph.D. students who helped me design and develop this automated video surveillance system. This project was sponsored by the National Science Foundation.

03:30 Another project has to do -- which I'm showing here a little bit about it -- has to do with designing a computer chip and a computer system for epileptic seizure prediction. The system would actually predict epileptic seizures before they happen.

03:31 Q. And that's with the use of computer chips?

03:31 A. Yes.

03:31 Q. Okay. Is that also funded by NSF or --

03:31 A. This is like while we're still working on it.

03:31 Q. Okay. I saw earlier that you're an inventor on a U.S. patent.

03:31 Will you introduce the jury to that patent?

03:31 A. Yeah. I have a slide about that.

03:31 So I have a patent on the design of Automated Video Surveillance Systems. Again, the system optimally recognizes the threats, detects the threats without any human intervention and allocate resources to different sources to different cameras in such a way that it will maximize the threat detection accuracy.

03:31 Q. Have you received any awards, Dr. Sarhan, in the field of computer engineering?

A. Yes. I received the -- multiple awards, including I have recently been inducted to Wayne State University Academy of Teachers. I received the Wayne State University President's Award for Excellence in Teaching. And I received an Outstanding Professional of the Year award from IEEE.

Q. Thank you.

Have you ever been retained as an expert witness in other technology and computer-related cases?

A. Yes.

Q. How many?

A. About ten, I would say.

Q. Have you ever testified as an expert witness in a patent dispute?

A. Yeah. I testified once. Actually, I appeared in this same court two years ago, also with Judge Albright.

Q. Have you ever been rejected by a Court as an expert witness?

A. No.

Q. Thank you.

Let's discuss your involvement in this case.

Were you hired as an expert witness in this case?

A. Yes.

03:32 Q. By whom?
03:32 A. ACQIS.
03:32 Q. Are you compensated for your analysis and testimony in this case?
03:32 A. Yes.
03:32 Q. Does your compensation depend in any way on the outcome of the case or the content of your opinions?
03:33 A. No.
03:33 Q. What were you asked to do in this case?
03:33 A. So I was asked to study the patents at issue this case and then look at the accused products, investigate the accused product, and see whether the accused products infringe the asserted claims of the patents.
03:33 Q. Did you also analyze the validity of the asserted patents?
03:33 A. Yes. I reviewed the defendants' expert witness reports on invalidity, and I responded to these reports.
03:33 MR. HALES: Your Honor, we tender Dr. Sarhan as an expert witness in computer science and computer engineering to evaluate accused products for potential infringement and the patents for issues of validity.

MR. BURESH: No objection.

THE COURT: He'll be admitted as an expert.

Ladies and gentlemen of the jury, we'll take our afternoon recess. Please remember my instructions not to discuss the case as well as the other instructions. We'll be back in 10 or 15 minutes.

THE BAILIFF: All rise.

(Jury exited the courtroom.)

THE COURT: Thank you. You may be seated.

And I'm not going to hold you to this.

(Off-the-record discussion.)

(Recess taken.)

THE BAILIFF: All rise.

THE COURT: Please remain standing for the jury.

(Jury entered the courtroom.)

THE COURT: Thank you. You may be seated.

Counsel?

BY MR. HALES:

Q. Dr. Sarhan, I'd just like to point out for the record, I delivered in the break four binders of various trial exhibits, and then two other binders I

don't think the jury can see. They're in your footwell just because we ran out of space.

I count four. Are there not two more of your expert report itself?

A. Yes.

Q. Okay.

A. Here.

Q. Very good. You can put that back. Let's return to the discussion where we left off.

Why did you decide to serve as an expert witness in this case?

A. Computer systems -- computer systems and data communication are my main areas of research and expertise. I also have experience in both the hardware and software aspects.

I'm also passionate about computer technology and how it evolved over time. And as a professor, I hope to teach the jury about the patents and the technologies at issue in this case.

Q. Thank you.

How did you go about performing your analysis in this case? What materials did you review?

A. So the core of my analysis relies on the patents themselves.

Q. Is that what we see on the screen here?

03:54 A. Yes. We have these five patents.
03:54 Q. How did you analyze these patents?
03:54 A. Initially, it took me a long time to review these patents. They are lengthy. They have a lot of figures, detailed disclosure.
03:54 So the -- and then like after that, since one of them, like, seems to be, like, representative of the others, I focused on one patent, the '768 patent. And I read that multiple times during the course of this case.
03:55 Q. For purposes of your testimony today, would a discussion of the '768 patent represent the contents of the other patents as well?
03:55 A. Yes.
03:55 Q. Okay. Can you provide the jury with a high-level overview of the contents of the '768 patent?
03:55 A. So the patent basically describes the state of computers or computer technology in the late 1990s. And they -- they describe the main limitations of one technology, which is referred to as the PCI local bus, at that time.
03:55 And then the patents disclose a solution or solutions to address these limitations while maintaining compatibility with operating system and application software.

03:55 Q. And we'll get into that in greater detail.
03:55 What other materials have you consulted to form your opinions in this case?
03:55 A. So I also reviewed the industry publications about the patents that are discussed by the patents themselves or disclosed by these patents.
03:56 Q. And for the jury's benefit, what is an industry publication or an industry standard?
03:56 A. Yeah. Basically, an industry publication is a set of requirements that must be followed by the members of the industry in order to have -- in order to achieve compatibility between related products.
03:56 To give an idea to the jury, the HDMI port on your TV is industry standard. And this is why you can use any cable -- any HDMI cable manufactured by any company. You can plug it into your computer -- your TV and it's going to work.
03:56 Q. What do we see here on our screen, Dr. Sarhan?
03:56 A. So here we see three of the industry standards that I reviewed. The first one is the PCI Local Bus implementation. The second one is the PCI Express Base Specification. And the third one is the Universal Serial Bus 3.0 Specification.
03:56 I also reviewed different iterations or revisions of these standards.

03:57 Q. Okay. Is that to say you reviewed these three specifications we see on the screen?
03:57 A. Yes.
03:57 Q. Okay. What did you do after studying the patents and these industry standards?
03:57 A. So after that, I studied the accused products and -- to determine -- and also the related technologies to determine whether these products infringe the asserted claims of the patents.
03:57 Q. What documents or other materials did you review to perform this analysis?
03:57 A. Yeah. So I basically reviewed the ASUS product specifications for the computers. Also, I reviewed the ASUS user manuals. And I also viewed other documents that are produced by ASUS and third parties, including Intel and AMD, which manufacture the processors that ASUS use in their computers.
Q. Have you reviewed any witness testimony in
03:57 this case?
03:57 A. Yes.
03:57 Q. What, at a high level, has that testimony
03:58 taught you?
03:58 A. So I reviewed the deposition testimony by ASUS employees. They spoke generally about how the products are designed and manufactured.

Q. How many ASUS products are accused of infringement in this case?

A. To my last count, it's 576 products.

Q. Did you study each one of these, Dr. Sarhan?

A. Yes.

Q. Will we be analyzing each of these products in court today?

A. Not directly.

Q. How many products will we discuss today?

A. We will be discussing only two products today.

Q. Okay. I'd like for you, if you can, to introduce the jury to the different categories of products that exist and introduce them to the representative products that we'll discuss today.

Why don't you start with the laptops that we see here on the screen?

A. So we have laptops, desktops, servers, and motherboards.

So laptops are basically portable -- yeah -- portable computers. They come with the screen, with the keyboard, with the track pad, with battery. And those are the type of computers that the lawyers are using right now in the court.

Q. Before you go on, Dr. Sarhan, I see you actually have a specific name for this, this laptop.

Is this one of the representative laptops we'll be discussing today?

A. Yes.

Q. Okay. And what -- which of the 500-odd accused products will this representative laptop represent?

A. Yeah. So this specific product will represent all laptop products.

Q. Okay. I see a desktop quadrant here in this image.

Can you introduce the jury to desktop products?

A. Yeah. We said laptops are portable. Desktops are stationary, are not portable computers. They are pretty much the computers that the jury might have at home.

They come -- they may be purchased with separate keyboards, monitors, and other peripheral devices. Sometimes they may come in the form of a all-in-one computer.

Q. What is an all-in-one computer?

A. An all-in-one computer is basically a computer that has all the computer components, and those would be integrated with the monitor, so it looks more like, you know, one big monitor.

04:00 Q. Kind of like Apple famously has those all-in-one desktop?
04:00 A. Yes.
04:00 Q. Okay. And I see you've named this one as well.
04:00 Is that to say that this is another one of our representative products?
04:00 A. Yes.
04:00 Q. Okay. Which products -- I guess which accused products will this product represent for purposes of your infringement analysis?
04:00 A. Sure. It represents all desktops, all servers, and all motherboards.
04:00 Q. Let's introduce the jury to these last two product categories that will be represented by the desktops.
04:00 What is a server?
04:00 A. A server is -- you can think about it as a high-performance computer that's used generally by the industries such as banks to process transactions very fast or to process a huge amount of information. And those generally do not come with the -- like, the -- with the peripheral devices.
04:01 Q. Do they come with -- so when you say "peripheral devices," is that to say they don't come

04:01 with, like, screens and keyboards and mice?

04:01 A. Yeah. That's right.

04:01 Q. And motherboards, will you introduce the jury
04:01 briefly to those?

04:01 A. Motherboards, basically a motherboard is the
04:01 main circuit board that we have inside any computer
04:01 product. So it's going to have a main circuit board
04:01 that has basically the -- it holds the different chips,
04:01 the different components that we have within the
04:01 computer and connects them together.

04:01 For example, here, we can see this
04:01 motherboard. And see here, we have a slot for -- where
04:01 we can insert the CPU. And here we have other slots
04:01 where we can insert the system memory. So it holds all
04:01 the main computer components together.

04:01 Q. Okay. At a very high level, what did you do
04:01 to perform your infringement analysis for the products
04:01 we see on the screen here?

04:01 A. Yeah. So basically what I did is that I
04:02 looked at the -- at the features of these products, and
04:02 then I see whether they meet the claim limitations of
04:02 the asserted patents.

04:02 Q. "Claim limitation" is a term you just used.
04:02 Will you introduce the jury to the concept of claim
04:02 limitations?

A. A claim limitation, like, generally at the end of each patent, the inventor will have a list of claims. A claim describes the specific technology or product or computer that the inventor regards as his or her invention.

Q. Dr. Sarhan, what patent claims are asserted in this matter?

A. Yeah. I believe I have a slide about that.

So here we have three apparatus claims, and we have four method claims.

Q. What is an apparatus claim?

A. An apparatus claim is a claim that describes a physical product such as a computer.

Q. What is a method claim?

A. A method claim describes the process that's used to manufacture physical products.

Q. Do I understand that right, it's steps to be followed to manufacture a product but not actually a claim on the product itself?

A. Exactly.

Q. Okay. Have you reached any opinions about whether the accused products in this case infringe the claims we see on the screen here?

A. Yeah. I believe that the accused products, they must demonstrate infringement of the asserted

claims of the patents.
Q. Is that reflected on Slide 12, Dr. Sarhan?
A. Yes.
Q. Thank you.
Will you please open your exhibit binder, the first one, to Joint Exhibits 1, 2, 3, 5, and 6 and confirm that those are the patents asserted in this case?
A. Yes. These are the asserted patents.
Q. As I said earlier, I'd like to focus on the discussion of the '768 patent, if you agree to that?
A. Yes.
Q. Dr. Sarhan, who is the named inventor of the '768 patent?
A. Dr. William Chu.
Q. And how far back do these patents reach in time as their priority date or kind of their invention date?
A. Yeah. So we see that here that they reach back to basically Year 2000.
Q. Okay. What do these patents describe?
A. Basically, they describe the state of computer technology in the late 1990s, and they discuss the limitations -- they disclose the limitations of the PCI local bus specification. And then they -- basically

they -- the patents describe solutions that will fix these problems.

Q. What solutions do these patents describe to problems that existed in the computer field at this time?

A. Yeah. So basically, the main problem was related to PCI local -- PCI local bus. And the -- like, the patents basically describe a way in which this -- basically, the PCI local bus limitation can be addressed.

Initially, the patents disclosed a portable module that Dr. Chu showed the -- an ACM, as we can see in this screen. So this is the ACM or the attached computer module.

This attached computer module can be inserted. It's in the office console, and then it will function as a regular computer. Then the user can take -- later on, the user can take this with him or her home and plug it in there, and he or she can resume work instantly from the place where they left off when they were at the office.

Q. Dr. Sarhan, we'll get to the specifics of the patent claims in a bit, but do any of the patent claims asserted in this case claim this attached computer module idea?

A. No.
Q. Okay. What do the claims actually at issue in this case focus on?
A. Yeah. They focus basically on the -- like, addressing the limitation of the PCI local bus.
(Clarification by Reporter.)
A. So the patents describe that the use of this module was not possible without -- with the existing computer bus technology at that time.
BY MR. HALES:
Q. Okay. And we're going to introduce very quickly the jury to the idea of a computer bus.
What is that?
A. Yeah. A computer bus is basically an interconnect that connects different computer components and devices together. It includes the wires on which the data will be transferred. Also, it includes any necessary software to do that.
Q. Is there a specific computer bus that these patents sought to improve?
A. Yes. It's the PCI local bus specification.
Q. Are you familiar with the PCI local bus specification?
A. Of course.
Q. How so?

A. I read it very well and...

Q. Okay. Did you have prior familiarity with it before you got involved in this case?

A. Yes.

Q. Okay. How so?

A. Yeah. While I was a Ph.D. student, like a graduate student, like I -- we learned about the PCI local bus.

Q. Okay. Will you please turn to Exhibit J-42 in your binder and confirm that that is a copy of the PCI local bus standard?

A. Yes.

Q. Have you studied this in the course of forming your opinions in this case?

A. Yes.

Q. Have you formed -- I'm sorry.

Have you studied other iterations or generations of the PCI local bus standard as well?

A. Yes.

Q. Okay.

MR. HALES: Your Honor, we offer J-42 into evidence.

MR. BURESH: No objection.

THE COURT: Admitted.

BY MR. HALES:

04:07 Q. Dr. Sarhan, at a high level, what is the PCI local bus standard?
04:07 A. Basically, the PCI local bus is an industry standard that describes a parallel bus that sends data on parallel. And I might have a slide about that.
04:08 So we see here -- we have -- on this slide we have one peripheral device, and here we have another device. And these two devices communicate to each other through the bus, which is what you see in the middle. So this is the interconnection between these two devices.
04:08 Q. Nabil -- I'm sorry, Dr. Sarhan. I'm being too familiar given our circumstances.
04:08 If you're trying to tell us straight, it's not coming through on our screens.
04:08 A. Oh, you cannot see that it's --
04:08 Q. We cannot. No.
04:08 A. Okay.
04:08 THE WITNESS: Also the jury, you cannot see? You can see it?
(Brief off-the-record discussion.)
04:08 BY MR. HALES:
04:08 Q. I can't see it on mine. How fortunate for everyone else. I'll tune in to your guys' screens.
04:08 Please proceed, Dr. Sarhan.

04:08 A. Yeah. So we have like on the left -- on the right, we have two devices, and these two devices are interconnected with the -- with the -- basically the PCI local bus, which is in the middle. We see all these wires. These are parallel wires.

04:08 So the data will be transferred on --

04:09 (Clarification by Reporter.)

04:09 A. So the data will be transferred in parallel across all these wires.

04:09 BY MR. HALES:

04:09 Q. Will you please describe how -- well, first, what we're looking at, and then how the PCI local bus operates with regard to this image?

04:09 A. Yeah. Sure. So this begins from the PCI local bus specification that we described a little bit ago. And here I added some limitation just to explain the principles.

04:09 So we see here we have different computer components. We have the processor, we have the graphics card, we have the local area network device that connects the computer like to the network such as the Internet.

04:09 The processor is the main -- like you can think about it as the brain of the computer. It's the part that executes instructions.

The graphics card is basically the device that prepares the graphics that you guys can now see on the screen. So all these graphics that you see is prepared by the graphics card.

Q. And is that the --

A. Or the CPU.

Q. And is that the PCI local bus we see in the middle is that two-sided arrow?

A. Exactly. And here we see the -- in the middle we see the PCI local bus. And you see the main purpose, the main goal of the PCI local bus is to connect all these components together.

Q. What are some important characteristics of the operation of the PCI local bus that you think the jury should understand for purposes of your analysis?

A. Sure. I prepared a slide about that that shows the main characteristics.

So one of them is parallel transmission. It requires a large amount of wires. It's a shared bus. It's bidirectional, but it can be used only in one direction at a time. And it uses single-sided signaling with either 3.3 or 5 volts.

Q. I'd like to take these one by one, if we can.

What does it mean that the PCI local bus utilizes parallel transmission?

04:11 A. Yeah. I have a slide to describe this.

04:11 As you see here, we have data. And this data is sent on parallel on all these wires. In reality what can happen with the PCI local bus, we can have either 32 or 64 data wires. So these wires can be either 32 or 64, and the data will be sent on all these wires at the same time.

04:11 As we see here, we have these bits, 0, 1, 1. And a bit here, we see it's 0 or 1. This bit -- a bit is the smallest unit of information in the computer. So the smallest will be one bit, which could either be the value zero or the value would be one.

04:11 Q. And was this the prevailing approach that the PCI used in the late '90s?

04:11 A. That's right.

04:11 Q. Okay. Are there any disadvantages to this type of signaling scheme?

04:11 A. Yeah. And I have a slide about that.

04:11 So parallel transmission has some major issues. First, it uses lots of wires, as we described before. It needs a lot of space also. It's very hard to mount these wires on the motherboard. Also, it suffers from a crosstalk --

04:12 Q. What is crosstalk?

04:12 A. -- crosstalk problem.

So here, we see like when we have data are transmitted on adjacent wires. So basically, data transmission on one wire may impact the transmission of adjacent wires.

To give an example, if a jury member is in a busy cafeteria and you try to speak with the -- trying to have a conversation with a friend, it's very easy to miss something your friend mentioned because a lot of people are talking at the same time in a closed space.

And this is what's happening here, but it's going to be even worse.

Q. I see a final point here on your slide, timing skew.

What is that and why is it significant?

A. Yeah. So see here, like those in the animation, like we saw these bits going all the way from the left to the right or from the right to the left, all of them in parallel.

In real life, it's very hard for these bits to arrive exactly at the same time. And this is basically the time skew and give us -- it gives designers a lot of problem.

Q. Okay. How many wires are we talking about employed in PCI Express? How many were utilized?

A. Yeah. I have a slide about this. And this

04:13 slide is from the PCI local bus specification that we discussed earlier.

04:13 Here, it shows one -- a certain device, one called PCI-compliant device. This is a PCI device that implements this specification.

04:13 And we see on the left, we have different wires that are required and shows the required pins, which are the required wires. And you can see it will have 47-plus wires.

04:13 Some of these wires, see here like this one is the address/data lines. And here, those are by themselves 32 wires.

04:14 (Clarification by Reporter.)

04:14 A. So those by themselves are 32 wires.

04:14 On the right side, we have optional pins. And those -- in some implementations, 32 bits may not be sufficient, so we have to go with 64 bits for the address and data bits. And we can get like, you know, in that case approximately 100 wires.

04:14 BY MR. HALES:

04:14 Q. For the jury's benefit, do you consider requiring anywhere from 47 to 80 pins or wires to be a lot for a computer bus standard?

04:14 A. Yes.

04:14 Q. What downsides are there to that requirement?

A. It's not going to be cable friendly, as -- like we're going to discuss later on. Also, the connector will be, like, bigger. It's going to have a lot of issues.

Q. I saw the term "shared" on your earlier slide.

What does it mean for a bus to be a shared bus?

A. Yeah. I have a slide to illustrate the concept.

You see here the process of sending data to the graphics card. And the LAN is waiting. The LAN waits for something or receives something but still waiting.

So -- and this is the whole idea of the shared bus. This bus is shared by everyone, by all the devices, but only one device can send at any point of time. So now when the processor sends data to the graphics card, the LAN has to wait.

When the processor is over, then it might be the term of the LAN to engage in the transaction.

Q. Would this scheme slow down the overall operation of a computer?

A. Of course.

Q. Okay. On your earlier slide, I think I read single-ended signaling with 3.3 or 5 volts.

04:15 Will you please introduce the jury to what this means?

04:15 A. Sure. And I think I have a slide to illustrate the concept.

04:15 Basically, in single-sided -- in single-sided signaling, we use one wire to transmit each signal. So we use only one wire to transmit each signal, but we may have multiple wires sharing a common reference line, like something like the ground.

04:16 Some people are familiar with house wiring. So there is a ground, the ground voltage. So we need to have a common reference.

04:16 But each -- generally each signal will be transmitted on a wire by itself. And you see here, in order to transmit -- to transmit one, if I send like one, which is the smallest -- like one bit is the smallest piece of information for the computer. If when I send one, then we have to bring the voltage to -- sorry.

04:16 To send one, we have to bring the voltage to its highest level. So we have to make the volt 5 volts. In order to send at zero, we have to make the voltage close to zero, right, and so on. And this is how we can -- we can send one, zero, one, zero, one and so on.

Q. Are there downsides to using a signaling scheme requiring 5 volts in order to generate a 1?

A. Yeah. 5 volts for data transmission is a lot. To give you an idea, like your car battery operates with 12 volts. And it's sufficient to power all the devices within your car. All the electrical requirements for the car -- by just this 12-volt battery.

Using 5 volts for transmitting data in a computer system is a lot.

Q. Thanks for this introduction to PCI local bus.

What does the '768 patent have to say about the PCI local bus?

A. Yeah. I have a slide that shows some of the main points.

Q. What are we looking at here, Dr. Sarhan?

A. Yeah. So here, we're looking to see -- we're looking at a snapshot from the '768 patent. It's one of the asserted patents in this case. And this is a snapshot of that patent, but I added some highlighting so that I can relay the information easily to the jury.

It says it clearly here that PCI buses are not cable friendly. Right? It says that the interface includes a very large number. You see a very large number -- a very large number of signal channels and

04:18 also large number of pins.
04:18 And it says that it costs more. And it's bulkier and more cumbersome to handle.
04:18 So this basically are the main limitation of the PCI local bus as described, as disclosed by the patents.
04:18 Q. Does the '768 patent propose a new bus to solve the problems you just identified with the PCI local bus?
04:18 A. Yes.
04:18 Q. What is that bus?
04:18 A. So here the patent -- again, this is a snapshot from the same patent. It says: It is desirable to use low voltage differential or LVDS channel. And it says that it's: More cable friendly, fast -- it's more cable friendly, it's faster, consumes less power, generates less noise, including electromagnetic interference.
04:18 Q. Again, if you would finish that sentence, please.
04:19 A. Yeah. And --
04:19 Q. Just "than a PCI channel."
04:19 Did I read that right?
04:19 A. Yeah. Than a PCI channel. Yes.
04:19 Q. Okay. How do you interpret this passage,

Dr. Sarhan? What is the author here trying to convey?
A. It means that the -- that the inventor is aware of the limitations of the PCI local bus and proposed -- disclosed a solution that will address these specific limitations.
Q. Does the '768 patent go on to disclose how to replace the signaling scheme and PCI local bus with an LVDS signaling scheme?
A. Yes.
Q. Okay. And we'll dive into that, but I want to discuss some constituent pieces first, if we can.
Do the asserted patents disclose to the reader how to understand this term, "low-voltage differential signaling," or LVDS for short?
A. Yes. And I have a slide that -- a snapshot from the patent.
Again, this is from the asserted patent, the '768 patent. It says that: The term "LVDS" is herein used to generically refer to low-voltage differential signals and is not intended to be limited to any particular type of LVDS technology.
Q. I see you've highlighted a couple of portions here with your telestrator.
Why have you circled "generically"?
A. Yeah. So here, those are the keywords that

I'd like the jury to pay attention to.

So here, the definition of LVDS, according to the patents themselves, it says that: This term should be used generically to refer to low-voltage differential signals and is not intended to be limited to any specific type of LVDS technology.

I think this is, like, very important, like, message I would like the jury to remember.

Q. Is this the meaning of LVDS you've applied in the course of performing your infringement analysis?

A. Yes.

Q. I want to focus on the DS portion of LVDS.

What is a differential signal?

A. Like as we discussed before, when we talk about single-sided signaling, "single-sided" means we only use one wire for each signal, right? Only one wire for each signal.

In double -- in differential signaling, we use two wires for each signal. So for each signal, we'd be using two wires instead of one. And basically, the data that want to encode, whether it's zero or one, we encode it as the difference in voltage between these two wires.

And the keyword here is the difference in voltage.

04:21 Q. I'd like to investigate that. But first, why would someone teach using two wires and two signals to do the job that used to be done by one wire and one signal? Why this extra hardware? Why this extra signal?

04:21 A. Yeah. By encoding the data as the difference in voltage between two lines, we make the data more reliable. So it can be transmitted in -- like, it will be resilient to noise interference and about factors that would impact the communicate -- the quality of the communication.

04:22 Q. How does differential signaling accomplish this greater resilience?

04:22 And if you can answer slowly, our court reporter would certainly appreciate it.

04:22 A. Sorry. I'm driving you crazy today.

04:22 (Laughter.)

04:22 A. So basically, we have -- we have two wires and -- very close to each other. And the -- basically, the noise will hit the two wires in exactly the same way. It will impact the two wires in the same way.

04:22 So if one of them, the voltage goes down, for the other one also the voltage will go down. The difference will remain the same. So although we're going to have noise, it's -- but the noise on both

04:22 lines will cancel each other.

04:22 BY MR. HALES:

04:22 Q. Have we attempted to demonstrate that on this slide here, Dr. Sarhan?

04:22 A. Yes. And here see, this is the single-sided scheme that we mentioned before that's used by PCI -- the PCI local bus specification. You see here we have only one wire to transmit the signal. But we said, like, we're going to have a reference voltage for multiple wires.

04:23 But here, basically, we have one wire for -- one wire, like, for each signal. In the case of the differential signal, we use two wires. Right?

04:23 So if you go here now, for single-sided signaling, if you look here at this figure, you see here, if we have noise, then we have fluctuation in the voltage here, right?

04:23 And if the fluctuation in voltage becomes severe enough, this one may be thought to be like a zero. So the receiver may think this one is a zero, so the data will be corrupted.

04:23 In the case of -- in the case of double-sided signaling, what's going to happen here, we're still going to have some noise, but the noise will impact both wires in the same way.

And, like, when one of them here goes down, that other one will go down. When the other one goes up, that other one goes up. So the difference remains unchanged. And remember that difference, because the data is encoded, is represented by the difference in voltage and is going to remain unchanged regardless of the noise.

Q. Is this resilience characteristic of differential signaling significant in your view?

A. Extremely. Remember, like, we use this type of signaling to communicate information from one place to the other.

When we communicate information, one of the most important metrics that we use is the fidelity of -- or the integrity of the data that we want to send. The most important thing, we want to send the data and receive it exactly the same way.

Q. Let's move to the LV portion of LVDS, low voltage.

What does the patent have to say about low voltage, and how do you understand that term?

A. Yeah. So as the term -- like, as it's shown here, like, you know, as it's -- the term itself means that instead of having high voltage, we're going to have low voltage.

04:25 Q. Okay. Do the asserted patents call for the same parallel transmission scheme you diagramed earlier where the bits are traveling side by side across stacked wires?

04:25 A. No. The data will be sent serially.

04:25 Q. What is serial transmission?

04:25 A. Serial transmission means the data will be sent one bit at time. Instead of sending the data on, like, multiple pieces of data in parallel on multiple wires, we send, like, the data serially, one bit at a time on one wire.

04:25 Q. What are we looking at here on Slide 30, Dr. Sarhan?

04:25 A. Okay. So here on the left, this is the left side. This is basically the scheme used by the PCI local bus that the patent discussed and describe its disadvantages.

04:25 As you see here, we have multiple wires and the data is sent in parallel on multiple wires at the same time. But it's going to be sent all -- but only one direction at a time, either the receive direction or the transmit direction. So this is basically the -- how things go with the PCI local bus.

04:26 Now, this is the -- on the right, we see the disclosed solution in the patents. As we see here, in

this case, we have two differential pairs, right? So these, one, two, because we're using differential signaling, which will cancel out the noise that we discussed before.

So we have one pair in one direction, and then we have another pair in the other direction. So the data can be communicated in both directions at the same time benefitting from the -- from the differential signaling approach that we cancel the noise.

Q. And is this the technology that is described and claimed in this patent?

A. Yes.

Q. Okay. Does the serial LVDS signaling discussed in the patents offer advantages over the parallel signaling called for in the PCI local bus standard?

A. Yes. And I have a slide about that to illustrate to the jury.

So on the left, we have the scheme used by the PCI local bus, right? And so this scheme will have too many wires. It will have high interference, high noise. It will have high voltage. It will have low data transfer rate. It will have high power consumption.

These are the characteristics of the PCI local

04:27 bus implementation.

04:27 In the disclosed solution in the -- these patents, basically we're going to have fewer wires. It's going to have less noise. The communication will be more reliable. The -- we're going to have lower voltage. It's going to have higher data transfer rate, and it's going to result in lower power consumption.

04:27 Power consumption relates to that -- to explain it to the jury, if we have higher power consumption, then your laptop battery will drain sooner. So it has -- it's a very important metric.

04:28 Q. Okay. I'd like to zoom out a little bit. Looking at these collection of -- this collection of advantages as an expert in this field, do you find this to be a significant collection of advantages over the prior art?

04:28 A. Certainly.

04:28 Q. Why?

04:28 A. I have -- I prepared a slide to summarize the benefits of the disclosed -- or the patented LVDS approach.

04:28 It's going to result in smaller connectors. It's going to have longer battery life. It's going to ensure faster operation, so the data is going to be sent faster. And it's going to result in fewer errors,

04:28 fewer transmission errors.

04:28 Q. Thank you, Dr. Sarhan.

04:28 I want to return to an issue I raised earlier: Do the patents teach how to implement LVDS in place of the parallel signaling scheme called for by PCI local bus?

04:28 A. Yes. The patents have detailed disclosure about that. And I believe I have a figure to illustrate this.

04:28 Q. Sure.

04:28 Dr. Sarhan, will you describe to the jury what we're looking at here on Figure 33? And take your time. We'll take as much time as it takes to make sense of what we're looking at here.

04:29 A. Yeah. Okay.

04:29 So the -- as you see here, the -- on the left side, we have the attached computer module, which is basically the module that we see next to Dr. Chu that he showed us, like, you can insert into the console.

04:29 And here, we have the peripheral console where we actually insert the -- that module.

04:29 And you see these two things are connected by the XIS Bus. And this bus includes this bus I want you to pay attention to, the XP Bus.

04:29 The -- now, if we look at the -- at the

attached computer module, we see here we have the CPU, which is the main part of the computer. It has the memory. It has the graphics subsystem. So it has the main components of the computer system. It also has the storage.

On the right side, we have the peripherals so that we can actually -- for example, like a screen or keyboard or whatever.

The -- as we see here, we have a PCI bus on the left, and also we have a PCI bus on the right, right?

Q. Right.

A. And these -- basically, two PCI buses will communicate with each other through the -- this interface controller and this interface controller.

Q. So thanks for that explanation. We've been discussing LVDS serial signaling technology.

Where is that in what we're viewing here?

A. Yeah. Exactly. So this one's going to be here. See the XP Bus. XP Peripheral Bus. So this bus has the LV -- the disclosed LVDS channels.

What's going to happen here, let's say that we have -- going to choose a different color here.

We have this -- still the same color.

So we have this PCI bus here. And let's say

this PCI bus needs to send data to the other PCI bus on the other side. They want to communicate with each other, want to establish communication between these two buses.

Now, what's going to happen, remember, the PCI --

(Clarification by Reporter.)

A. So the PCI bus is a parallel bus, right, as we mentioned before. So it's going to send the data in parallel format to the host interface controller.

The host interface controller will convert it to serial format. It's going to send it serial one bit at a time. And these data will be sent on these LVDS channels which are part of the XP peripheral bus.

When this data goes to the other interface controller, which is this interface controller now, what's going to happen, it's going to do the opposite. It's going to get the data in serial format, receive it in serial format, convert it to parallel format so that this -- the PCI bus will receive it in the manner it's accustomed to.

BY MR. HALES:

Q. That sounds great, but does the patent teach how that host interface controller does the process you just described, take in parallel PCI data and serialize

04:32 it for transmission on the LVDS channels?
04:32 A. Yes. We have some -- the patents have
04:32 detailed disclosure about that. And I have a figure.
04:32 But I do not want to put the jury to sleep or bore
04:32 them. So please bear with me.
04:32 I'm going to try my best to explain. I only
04:32 have so many minutes. If I'm going to go over every
04:32 single unit, it's going to take forever. So I'm going
04:32 to just, like, give you an idea about the overall
04:32 points so that you understand the overall principles so
04:32 that you can judge accordingly.
04:32 Q. And if you could start by saying where this is
04:32 from, that would be great. Thank you.
04:32 A. Sure. So here, this one, again, is from the
04:32 '768 patent, one of the asserted patents in this case.
04:32 And we see here, we have -- again, here, see, we have
04:32 the host PCI bus on this slide.
04:32 Q. And before you get going, what is this overall
04:32 box that we're looking at with all of the sub
04:32 components?
04:32 A. Yeah. So this one is referred to as the -- is
04:33 the host interface controller.
04:33 Q. Okay. So is this the component that receives
04:33 the PCI information and serializes it before it goes
04:33 on --

A. That's right. So when I --

Q. If I can finish my question.

-- before it goes on the LVDS channels?

A. That's right. So like when we talk about the PCI local bus and they examine it and they said is going to be sent to the other one, when the first one sends to the other one, like is going to go to first to that host interface controller.

Q. Okay. Will you please describe to the jury how the host interface controller -- how the sausage gets made, so to speak?

A. Yeah. So here, the -- remember the PCI bus. It works in parallel form. Right? Transmit data in parallel form. So this data now will come and will be stored in these buffers -- or not just all of them, but will be stored in these buffers temporarily. And then this data will be encoded in a certain format.

After that it's going to be sent to this unit, which is the serial to parallel -- which is the parallel to serial converter.

Now, the data that receives it from the PCI bus will be in parallel. That parallel to serial converter does exactly what the name means. Like it just will -- will convert the data from parallel form to serial form so that it can be sent on these LVDS

channels.

Q. Okay. Thanks for that crash course on how the host interface controller works.

So I'm going to pop back a slide. Here we have an ACM on the left, a peripheral console on the right, PCI local bus hardware on both systems, and then the LVDS sits in the middle.

Is this the only type of embodiment of Dr. Chu's invention disclosed in his patents?

A. No. We have other documents and here I have another figure. And in this -- this specific embodiment, here this is Figure -- it's Figure 8B in the '768 patent.

Now, if we look at this figure closely, here we see the CPU. It's -- and it's integrated with other units. Like within the CPU, we're going to have other also units. And we -- here, we have a channel extending directly from this integrated CPU. And this is -- you see here, it's called the XP Bus, which has the LVDS channels.

So in this -- this embodiment teaches having LVDS -- LVDS channel extending directly from the CPU, which might be integrated by -- with other units.

Q. Dr. Sarhan, looking at this image and having read the patents, does this embodiment of Dr. Chu's

inventions have any PCI local bus hardware in it?

A. No. And as a matter of fact, like if you look back, if you -- can you go back to the previous slide? I think it's very important for the jury to see.

Q. This one?

A. So here, like you see, like it's marked directly. In the patents themselves, we see this is PCI bus. Here it says this is PCI bus.

And the slide after -- I mean the one just before this one. Yeah.

And here this one is marked as a PCI bus.

Now, here, in Figure 8B, which is another figure in the same patent, here, we don't have any PCI bus. And we have these LVDS -- LVDS channels extending directly from this bus.

Q. Is this an important figure for your patent analysis in this case?

A. Yeah. And I think this is something very important for the jury to pay attention to. Because the accused products, the accused ASUS products do not have any PCI local bus hardware. So they don't have a PCI local bus hardware.

And -- however, they do exactly what's done here. Like we have a CPU, and from the CPU, which could be integrated with other units, we have an LVDS

04:36 channel extending from there.

04:36 Q. Thank you.

04:36 Dr. Sarhan, let's move on to patent claims, if you don't mind.

04:36 Dr. Sarhan, how have you approached your understanding of the claims, the patent claims in this case?

04:36 A. Yeah. So initially, the -- there used to be like -- when I first work on this case, there used to be a huge number of claims.

04:37 And then the claims -- like a -- like the asserted claims, like, became smaller and smaller to the extent now we have a smaller number of claims so that the jury can be able to, like, examine them and make their decision.

04:37 So now we have a smaller amount of claims. The -- although there's -- even like before, there used to be a huge number of claims, but they shared some limitations. They shared certain elements. Right?

04:37 And in my analysis, I tried to focus on the claim limitations that appeared the most. Right? Especially like in this presentation to the jury, I'm going to focus on the claim limitation that -- on the limitation that appear in most claims so that you can get the overall picture in the best way possible.

04:37 Q. Have you identified some of the most important often repeated claims -- I'm sorry -- claim limitations found in the asserted claims?
04:37 A. Yes. And I have a slide about that.
04:38 Q. Let's take a look at those.
04:38 Will you please introduce the jury to, I guess, what they're looking at here?
04:38 A. Yeah. So these are the claim limitations that appear in most claims. Right? So these are the most popular claim limitations.
04:38 A claim limitation is an element. It's part of the requirement of the overall claim.
04:38 Q. Okay. So when we get to the claim language and start performing the infringement analysis, we'll see these six limitations again and again?
04:38 A. Exactly.
04:38 Q. Okay. Let's learn about them. Let's start with the first one, if we can.
04:38 Dr. Sarhan, what should the jury know about an LVDS channel conveying address and data bits of a PCI transaction?
04:38 A. Yeah. So here, I think the most important thing for the jury to realize first here is that we have a PCI transaction. And the Court construed the term, so it give a specific meaning to this term as we

04:38 see on this slide.

04:38 So the Court construed "PCI bus transaction"
04:38 as a transaction in accordance with the industry
04:39 standard PCI local bus specification for communication
04:39 with interconnected peripheral component, and "in
04:39 accordance with" includes backward compatibility.

04:39 And also, I want the jury to pay attention to
04:39 what I underlined here. So here, according to the
04:39 Court construction, "in accordance" includes backward
04:39 compatibility.

04:39 Q. Can you help explain kind of accessible terms?
04:39 What does it mean for something to be in accordance --
04:39 well, let me start from the end.

04:39 What does it mean for something to be
04:39 "backward compatible"?

04:39 A. Yeah. So the -- as we -- we'll see like in
04:39 the later slide, the -- like, as I mentioned -- or even
04:39 I mentioned earlier when I describe the patents, I said
04:39 like the patents, I defined problems in the PCI local
04:39 bus specification. And then the sure, like, ways to
04:39 address this limitation. And address these limitations
04:40 while maintaining backward compatibility with the PCI
04:40 local bus. So we want to make sure it's compatible
04:40 with the PCI local bus.

04:40 Q. How is that -- if I can ask, how is that

04:40 compatibility described in the patents? What does it mean that we can use these new LVDS channels but remain compatible with PCI local bus?

04:40 A. Yeah. So one of the things -- like, this is an important question. In real life, software development takes time. You have companies that design and develop operating system. For example, Microsoft, like they have their Windows operating system. There are also, like, other companies like Apple, they have their own operating system, iOS, et cetera.

04:40 It takes time to make massive changes to the operating system, to support, let's say, like new interconnect. Right? So this takes a little while.

04:40 And also, they have to basically debug it, which works with different -- for different devices. This takes a lot of time.

04:40 So the patents describe a solution that will work with existing operating systems without any modifications, with existing drivers without modifications.

04:41 So the solution that we discuss here in the -- that are disclosed in the patent are supposed to work with no changes whatsoever to the operating system, or to the applications, or to the drivers, or to the BIOS, et cetera.

04:41 Q. Thank you for that explanation.
04:41 Have you applied the Court's definition for this claim limitation in performing your infringement analysis?
04:41 A. Definitely.
04:41 Q. Have you researched whether the accused products satisfy this limitation: LVDS channels to convey address and data bits of a PCI transaction?
04:41 A. Yes. Remember when we talk about the PCI local bus and we said it has all these limitations? It was the technology prevailing in the late 1990s. And that the patents said that it has all of these sort of problems that we discussed previously.
04:41 This -- the PCI local bus was then replaced by a new technology called PCI Express. PCI Express is an evolution over the PCI local bus implementation. The accused products, they have this technology. They have the PCI Express technology. And this is the technology and the question, like, that we're going to be analyzing in a little bit.
04:42 So this -- the PCI Express technology basically use -- employs LVDS channels that convey address and data bits of a PCI transaction, as we'll see later on in a little bit more detail.
04:42 Q. Thank you for that. I want to put a finer

04:42 point on it if I can.

04:42 Have you concluded whether PCI Express satisfies the limitation we're looking at here on our screen?

04:42 A. Yes.
04:42 Q. And what have you concluded?
04:42 A. Yeah. I concluded that it does satisfy these -- this claim limitation.
04:42 Q. Will you open your binder to J-20, please?
04:43 A. Yes.
04:43 Q. What is J-20?
04:43 A. So this is the PCI Express Base Specification.
04:43 Q. Have you reviewed this document in performing your infringement analysis?
04:43 A. Yes.

04:43 MR. HALES: Your Honor, we'd like to offer this into evidence.

04:43 MR. BURESH: No objection.

04:43 THE COURT: Admitted.

04:43 BY MR. HALES:

04:43 Q. What does this document have to say, if anything, about the term that we see on our screen here, ability to convey address and data by PCI bus transaction?
04:43 A. Yeah. So I have a slide that shows this

04:43 information.

04:43 So basically the -- if we -- again, this is the document that we just discussed, the PCI Express, which is the evolution of the PCI local bus.

04:43 In the introduction, so this is in the -- like, the mid section of the -- of this -- of the PCI Express standard, it says clearly that: The key PCI attributes -- again, here, this is PCI -- the key PCI attributes, such as its usage model, load store architecture, and software interfaces, are maintained, whereas its parallel bus implementation is replaced by a highly scalable, fully serial interface.

04:44 Q. I'd like to parse this and see if we can make it a little more accessible for the jury.

04:44 What does it mean that key PCI attributes, including a usage model, load store architecture, and software interface, are maintained in PCI Express?

04:44 A. Yeah. So basically here the -- like, to make it, like, as simple as possible, PCI Express uses a PCI-compatible software model.

04:44 So by design, PCI Express is made so that it retains compatibility with the software model of PCI.

04:44 Q. Is that your conclusion, or is the PCI Express standard --

04:44 A. This is --

04:44 Q. -- explicit in this regard?
04:44 A. Yeah. It's very explicit, and we see some statements that are on -- directly from the
04:44 specification about that.
04:44 Q. Okay. Let's look at the second half of this
04:45 sentence.
04:45 Its parallel bus implementation is replaced by
04:45 a highly scalable, fully serial interface.
04:45 What is important about this statement for the
04:45 jury's analysis today?
04:45 A. Yeah. So what's important here is that --
04:45 like I'm sure the jury will, like, kind of remember,
04:45 like, we talked about so much about the parallel bus.
04:45 Like, we said this is bad, right?
04:45 So -- and the PCI Express -- PCI Express
04:45 replaces that parallel bus with a serial interconnect,
04:45 a fully serial interconnect.
04:45 And remember when we talk about the patents,
04:45 we said that the patents, they want to replace the,
04:45 like, basically the PCI -- that -- the parallel PCI bus
04:45 with a serial interconnect utilizing LVDS channels.
04:45 Q. Well, we have serial. Do we have LVDS
04:45 anywhere in the PCI Express standard?
04:45 A. Say it again.
04:45 Q. LVDS, do we have any disclosure of whether PCI

Express uses low-voltage differential signaling?

A. Yes. Definitely. We have that from the standard itself.

MR. HALES: Let's take a look at Slide 40.

BY MR. HALES:

Q. Will you please tell the jury what we're looking at here?

A. Again, so this is the PCI Express specification. So this specifies the PCI Express standard.

And here, it says that the fundamental PCI Express link consists of two low-voltage, differentially driven signal pairs, a transmit pair and a receive pair, as shown in this figure.

So here it shows this figure as well.

And in this figure, you see here we have two components that communicate with each other. And you see here we have -- this one is one pair that's used in one direction. And here we have another differential pair in another direction.

And as we see here, it describes that these are low-voltage, differentially driven, which means that they are low -- they use differential signaling. And they have low -- and also low voltage at the same

time. And each -- and in each direction. One in the transmit direction, and one in the receive direction.

And this is basically like what we talk about when we discuss the patents.

Q. Who published this document? Who wrote this?

A. This is, like -- as I mentioned earlier, like, a standard is written, like, by a body of companies. They have different companies, like Intel and so many other companies, computer-related companies. They sit together, they form certain committees, and they develop standards accordingly.

Q. And so the fruit of that effort is what we're looking at here. They've described this as low-voltage, differentially driven signaling; is that right?

A. That's right.

Q. Okay. And you interpret this figure to show that it will use unidirectional pairs of those low-voltage, differentially driven signal pairs?

A. That's right.

Q. Okay. So I appreciate that you've reviewed the PCI Express standard and made conclusions about what's in PCI Express.

Have you reviewed any other materials -- independent materials of what this body says about this

04:48 technology?

04:48 A. I reviewed so many different material,

04:48 including a presentation by Intel. Intel like --

04:48 Q. Let me stop you right there.

04:48 A. Sorry.

04:48 Q. I need to seal the courtroom to talk about

04:48 Intel documents.

04:48 MR. HALES: With apologies to our

04:48 gallery.

04:48 THE COURT: If there's anyone in the

04:48 courtroom who's not under the protective order, please

04:48 step outside.

04:48 (Sealed proceedings.)

04:48 BY MR. HALES:

04:48 Q. Dr. Sarhan, I believe you were referencing an

04:48 Intel document?

04:48 A. Yes. So basically, it's a presentation by

04:49 Intel. Intel -- just like to tell the jury, I'm sure

04:49 like most of you might know, Intel is one of the main

04:49 processor companies in the whole world. And they make

04:49 processors and those processors are used, like, by so

04:49 many companies, including ASUS. And actually played a

04:49 center role in the development of PCI Express.

04:49 Q. Dr. Sarhan, will you open to P-744 in your

04:49 binders and tell me if this is the Intel document which

you just referenced?
A. Yes. It's the one.
Q. What does this document -- what is this document, and what does it describe?
A. So this document is -- provides information, details about the PCI Express specification.
Q. But specifically, like, its title page, what indication does it give to you of how it was used and put together?
A. Yeah. So here we say that PCI --
(Clarification by Reporter.)
A. So many, like, very heavy documents. It's better than going to the gym.
So basically, it says: PC Architecture to IDC. And here it talks about, like, different aspects of the PC, which is the computer architecture.
It talks about so many different interconnects and interfaces.
BY MR. HALES:
Q. Have you relied on this document in forming your opinions?
A. Definitely.
MR. HALES: Your Honor, we offer it into evidence.
MR. BURESH: No objection.

THE COURT: Admitted.

BY MR. HALES:

Q. Dr. Sarhan, I'm showing you here on Page 41 an excerpt from that document.

Will you please tell the jury what we're looking at?

A. Yeah. So here we see the title of the slide is PCI-Express Overview, which is the standard that we're talking about. And here, it -- clearly, it says [redacted]

And also, I want to bring to the attention of the jury, this figure which describes this in some detail.

And again, here we see we have differential signal occurs. See here, [redacted]

Q. Thank you.

MR. HALES: Your Honor, we can unseal the courtroom at this point.

THE COURT: Okay.

(Sealed proceedings end.)

04:51 MR. HALES: I'll proceed if I don't need to wait for anyone to come back in.

04:51 BY MR. HALES:

04:51 Q. Dr. Sarhan, have you studied how much voltage PCI signaling calls for?

04:51 A. Yeah. Yes.

04:51 Q. Have you collected the voltage amounts in your expert report?

04:51 A. Yeah. In my expert report, I have -- I made one table that shows the voltage levels.

04:52 Q. Is this that table, Dr. Sarhan?

04:52 A. Yes. This is part of the table that I have in my expert's report. And here, like, may seem to be too complicated, but, like, I'm going to describe it in the easiest way possible.

04:52 You see here, like in this column, we have the different technology. And here, we have different PCI Express speeds and generations. On the left, these are different -- see, 2.5 GT per second. These are different speeds. As we go down, we have higher speeds generally.

04:52 And here, we have -- in this column, we have the minimum voltage. And here, we have the maximum voltage. And you see it calls it $V_{TX-DIFF-P-P}$, which is basically the peak-to-peak differential voltage output,

right?

And here, we can see that, like, generally, for PCI Express, we're going to have a value -- a minimum value from .8 to a maximum value of 1.2 volt. So from .8 volt to 1.2 volt.

Q. Okay. So if we were to average those, we'd come out with 1 volt?

A. Yeah. Probably. I didn't do the average myself.

Q. Well, would you remind the jury how many volts are called for in the PCI local bus standard?

A. In the PCI local bus standard, which is the old one that we discussed, uses either 5 volt or 3.3 volt.

Q. And here, we're using roughly somewhere between .8 volts and 1.2 volts, if I've understood your testimony?

A. That's right.

Q. Is the voltage that you see here on the screen what you would consider low voltage within the meaning of the asserted patents?

A. Definitely.

Q. Dr. Sarhan, I'd like to discuss address and data bits.

What are address and data bits?

04:53 A. Okay. So I have a slide about that to illustrate the concept.

04:53 But before getting to the address and data bits, let's say where do they actually come from.

04:53 So here on the left, we have a set of commands that PCI -- like, that PCI transactions have. So we have different types of commands. We have memory read, memory write. We have I/O read, I/O write.

04:54 So these are the main commands that we have in the -- in PCI. The -- those commands or requests include address and data bits of a PCI transaction. So we have address and data bits.

04:54 What do you mean by address bits and data bits?

04:54 So the address bits are the -- they describe where the data will be written or where exactly we're going to get it from. So it specify that address.

04:54 The data is the data that we're going to communicate from one place to another place.

04:54 And knowledge here I would give to the jury is this: Like if a jury member would like to send a letter to someone, he or she would put the address. The address will specify where this letter will go. Right? And this is similar to the address in the case of PCI.

And when you write the letter -- when you send the letter, when you write the actual letter, what you write is the content, is the actual data. And so basically, the data, you send this data, which is the actual content of the letter. We sent it to a certain destination. Right?

Q. How have you concluded that PCI Express uses address and data bits?

A. Yeah. So the -- of course I looked at the -- the standard itself gives us guidance about that. It shows clearly that PCI Express has address and data bits.

Q. Is that what we're looking at on Slide 44?

A. That's right. Again, this is from the PCI Express specification. And this is the most authoritative document on PCI Express. This is why it's the specification.

And here, it shows -- like, it may seem to be complicated, but here it shows basically the packet, the collection of data that we have, the unit of data that we want to send.

And see, this is the -- like, this is basically the generic packet, and part of the packet here, one header will be for the data. So the data that will be sent from one device to another, from one

04:56 unit to another is included right here.
04:56 Q. Have you concluded whether PCI Express uses address bits as well?
04:56 A. Yes. And also the specification itself teaches that PCI Express has address bits as well, and also some other documents have that information as well.
04:56 Q. Will you please look at P-488 in your binder, Dr. Sarhan?
04:56 A. Yes.
04:56 Q. What is P-488?
04:56 A. It's a -- it's Introduction to PCI Express - A Hardware and Software Developer's Guide. So this is a book, a developer guide, and it's issued by Intel Press.
04:56 Q. Okay. And is this a document you've relied on to conclude that PCI Express uses address bits?
04:56 A. Yes.
04:56 MR. HALES: We offer it into evidence, Your Honor.
04:56 MR. BURESH: No objection.
04:56 THE COURT: Admitted.
04:56 BY MR. HALES:
04:57 Q. Dr. Sarhan, will you tell the jury what we're looking at on Slide 45?

04:57 A. Yeah. So here it shows the different type of requests. So here, we have memory requests, and here we have the memory. Like here -- sorry. This is 64-bit address memory request, and this is 32-bit address memory request. And this is I/O. The bottom we have the I/O request.

04:57 So these are different type of requests. And here, it shows the header. "Header" means like the beginning. Generally, it's the beginning of the packet. It describes some stuff that's -- are related to the packet.

04:57 And inside that header, which is part of the whole overall packet, we see here these fields. It shows here clearly the address bits.

04:57 Q. Thank you.

04:57 Dr. Sarhan, do you consider the address and data bits used in PCI Express to be address and data bits in accordance with the PCI local bus specification?

04:57 A. Yes.

04:57 Q. Why?

04:57 A. As I mentioned earlier, PCI Express uses the -- uses a PCI compatible software model, right? And I have the -- I believe I might have a slide here. Yeah.

04:58 So this is, again, from PCI Express, right? And it says here clearly that it has a PCI compatible software model.

04:58 This is one of the many features of PCI -- PCI Express. And this is why it was able to become as successful as it became.

04:58 And here, it shows that it has the ability to enumerate and configure PCI Express hardware using PCI system configuration software implementation. So this is part of the software that you have in the computer.

04:58 What does it mean?

04:58 This software is designed for PCI. It's designed -- this software is just -- the only thing it knows in the world is PCI.

04:58 It does not know anything about PCI Express because it might be newer. Right? So this -- basically the PCI Express has the ability to work with old software that was meant only for PCI.

04:59 And also, it says it has the ability to boot existing operating systems with no modification. Don't -- does not need any modification to the operating system. So the -- you have -- even if you have a legacy operating system and you have PCI hardware, PCI devices, it's going to work without any problem, although the operating system itself --

04:59 although the operating system itself does not know anything about PCI Express. It was made before even PCI Express.

04:59 So it has nothing to know about PCI Express, but still it can work with PCI Express devices with no problem.

04:59 And also says that it can support existing I/O device drivers. And these drivers also ended up -- software -- software that we have in the computer, and it can work with those with no modifications as well.

04:59 And finally, it has the ability to configure and enable PCI Express functionality. So still, PCI Express has some additional functionality. That functionality is enabled by adopting the PCI configuration paradigm.

05:00 Q. Thank you for that.

05:00 Dr. Sarhan, have you prepared any demonstration about how the PCI Express system achieves this compatibility with PCI local bus?

05:00 A. Yes. I have a figure to show that. And that --

05:00 Q. My question of course, as always when we look at a slide, is what are we looking at? And please help the jury understand why you find this significant.

05:00 A. Sure. So this is, again, from the PCI Express

05:00 specification. This is the most authoritative document that describes PCI Express.

05:00 And here, this is a snapshot. But I added some highlighting. The highlighting is mine, just to make sure like the jury can follow easily.

05:00 And see here, this is the CPU. This is the main -- the brain of the computer, which execute instruction and software. And remember on the previous slide, we said that PCI Express uses a PCI compatible software model. Right?

05:01 Now, when the CPU execute instructions from that PCI compatible software, right, is going to encounter some instructions. And while it executes these instructions, it will convey address and data bits of a PCI intersection.

05:01 To give you like a specific example, let's say that this CPU wanted to execute -- in here we have certain software that executes -- a program that execute. And in the program here, we have a write instruction, memory write instruction. So this instruction will be writing to the memory. So -- and the memory can read -- right?

05:01 And -- sorry. So here, like -- so it's going to be writing to memory, but the PCI Express devices -- so this is the CPU. It executes code, and part of the

code we have a memory write instruction.

This memory write instruction, if you have a certain -- like depending on the address of that instruction, it might be for a certain PCI device or within the territory of a certain PCI device or within a certain PCI Express device.

Here, I'm showing like those devices differently. I'm showing the PCI Express endpoints. See this? I'm showing them in this color.

And I'm showing here the -- old PCI local hardware in here. So this is the old PCI hardware. So in this system, we're going to -- we have old and new hardware. The new -- the new PCI Express hardware and the old PCI local bus hardware.

The -- when the CPU, like, executes instructions from that PCI compatible software, it may encounter, let's say, a memory write instruction. This memory write instruction, what does it do? It's going to write to a memory location.

That memory location could be either in this memory, or it could be in the -- in -- within a certain PCI device or within a certain PCI Express device. Right?

So now -- and it will have -- because you're writing to a memory, you have to specify -- when you

05:03 write something, you have to specify where to write it.

05:03 Q. And what do you use to specify where to write something?

05:03 A. Yeah. This -- the address. So you need to know the address of the location where you're going to write the data.

05:03 And also, because you want to write something, you need to write data. Right? So the memory write instruction includes data that want to communicate, will write to the memory, and it's going to have the address.

05:03 And because -- remember, like we said, this is PCI compatible software. The CPU now is executed --

05:03 (Clarification by Reporter.)

05:03 A. So the CPU -- I feel bad for my students.

05:03 So the -- basically the -- when the CPU execute PCI compatible software, right, if the -- those are meant like -- I mean, it's PCI compatible. So that would -- when you have a memory write instruction, they are going to -- those address and data bits will actually be for a PCI transaction, because this whole term is PCI compatible software.

05:04 And another reason I would give about this is that the -- remember we talk about the courtroom section, this Court, like all the certain definition

05:04 of -- definitions of certain terms?
05:04 The Court said define PCI Express -- a PCI transaction to be a transaction in accordance -- in accordance with the PCI local bus specification. And then it says -- it clarifies and says "in accordance includes compatibility." Right?
05:04 This is the key word, compatibility.
05:04 PCI Express is backward compatible with the PCI local bus specification. And this is one of the main features of PCI Express, and this is what contributed to the great success of PCI Express.
05:04 BY MR. HALES:
05:04 Q. Thank you, Dr. Sarhan.
05:04 Have you prepared a demonstration of how a CPU is able to speak both to a PCI local bus device and a PCI Express device?
05:05 A. Yes. I have one quick animation about this.
05:05 I wanted to make it in the easiest way possible so that the jury can understand, but there's more details to it. Just like an oversimplified animation that explains just the overall concept.
05:05 Q. I'll hit "play." You go ahead and explain what we're looking at.
05:05 A. Sure. So here the CPU is going to be sending data to a PCI Express device. This is a new device.

Right? And --

Q. And I think you saw a switch of orientation in there from --

A. Exactly.

Q. -- one angle to another.

Can you tell the jury what that was?

A. Yeah. So basically, the CPU -- like, we -- the CPU will have address and data bits. The address and data bits of the CPU are parallel. So the CPU will send the data to the root complex in parallel form. This is how the CPU operates. It has a parallel bus.

So it will send the data in parallel to the -- like, in parallel form, and then the root complex will serialize the -- this data, will send it serially over to the PCI Express device, which is the new device that we're referring to here.

Q. Can you explain to the jury how it works if the CPU wants to speak to any PCI local bus device?

A. Yeah. So here we have another -- another part of the demo now. The same thing, it will be converted -- data converted -- it's going to be -- it's going to be converted to the serial to PCI Express, and now it's going to go to the PCI local bus. And now those devices will receive this data in parallel format because of this little thing here.

This is the bridge, a bridge that bridges between PCI Express and PCI -- the old PCI.

Q. Thank you, Dr. Sarhan.

The CPU, when it issues this memory write instruction, does it know whether it's speaking to a downstream PCI local bus device or if it's speaking to a PCI Express device?

A. A -- like, it's going to be, like, we have a certain command, like let's say a memory write command, within a certain software that we set up the addresses in such a way so that work fine.

The data -- like, it will send -- like, the root complex will know what addresses belong to it. And then it will actually work on them and forward them to the place that can -- will claim those addresses.

Q. So thanks for that. I guess my question's a little different.

When the CPU says, I want to send this downstream, does it -- does it operate in one way for PCI local bus devices and a different way for PCI Express devices?

A. No. It uses a PCI compatible software, and the data will be sent using memory commands, like, memory -- and by memory read or memory write commands or I/O read, I/O write. But memory read and memory

write are the more common commands.

Q. And when these endpoints, whether it's PCI local bus or PCI Express, present themselves to the CPU, do they say, hey. I'm PCI Express. Or do they say, hey. I'm PCI local bus. How does that work?

A. Yeah. Actually, the -- like, the devices are enumerated. Like, when you, for example, like, turn on your computer, like you have your -- any machine that you have, Windows, Linux, whatever machine, when you turn it on, at the very beginning it will do a process called enumeration.

In the enumeration process, it will recognize the different devices that are connected. Could be, like, if we have, like, an old computer with PCI local bus hardware or we have a new one with PCI Express, or sometimes they may exist with each other.

Now each device will be identified accordingly by the -- using the PCI configuration paradigm. And this is a PCI configuration mechanism.

Like, for example, like, you know, when working on this case, I -- like, I used some software, like, to look at the devices and I have like a figure on my report. What I -- in my -- in my -- in my computer, in that software that I use, when I did that enumeration to see the list of devices, all the devices

05:09 are shown to be PCI devices.

05:09 Not that they are PCI devices -- these are PCI Express devices, but they are using the PCI enumeration paradigm. And the devices will be thought of as if they are PCI devices, right?

05:09 But in this enumeration process, of course they can be configured using the new capabilities and additional function maybe that they might have.

05:09 Q. Thank you, Dr. Sarhan.

05:09 I'd like to move on from this point to the other five elements you'd like to teach the jury about.

05:09 But I -- before we go, based on your study of the asserted patents, have you concluded whether PCI Express transactions are backward compatible with the requirements of the PCI local bus specification?

05:09 A. Yes.

05:09 Q. Okay. Have you determined whether, in your view, the address and data bits of a PCI Express transaction are properly considered to be in accordance with the PCI local bus specification?

05:10 A. Yes.

05:10 Q. All right. Let's return then to that second element of the six that you'd like to introduce the jury to.

05:10 What is important for the jury to know about:

LVDS channel conveying USB protocol data, packets, or information?

A. Yeah. So, again, this is -- we've talked about the most popular claims in the patents. This is the second claim that we have in that list, which is basically: LVDS channel conveying USB protocol data/packets/information.

And the Court also, basically, like, construed the term to have its plain and ordinary meaning. So USB here, when you deal with USB, I'm instructed to apply a plain and ordinary meaning of this term.

Q. Is that the meaning you've applied in your analysis?

A. Yes.

Q. What have you analyzed to see if this limitation is met in the accused products?

A. So basically the -- like, I identified certain USB ports, USB 3.X, could be USB 3.0, 3.1, 3.2, or USB 4 or Thunderbolt. These ports basically, like, meet this limitation, LVDS channels conveying USB protocol data.

Q. Will you open to J-47, please?

And once you're there, will you please share with the jury what you're looking at?

A. Okay. Yeah. It's the -- you said J-47,

05:11 right?

05:11 Q. Yes.

05:11 A. Yeah. It's the Universal Serial Bus 3.0 05:11 Specification.

05:11 Q. The same one that you analyzed in forming your 05:11 infringement opinions?

05:11 A. Yes.

05:11 MR. HALES: Your Honor, we offer it into 05:11 evidence.

05:11 MR. BURESH: No objection.

05:11 THE COURT: Admitted.

05:11 BY MR. HALES:

05:11 Q. What does this document say relative to the 05:11 term that we see here on your screen?

05:11 A. Yeah. So here -- and I have a slide about 05:11 that, a snapshot from the -- I have a snapshot from, 05:12 again, the USB 3.0 Specification.

05:12 And I'm sure like most of the jury worked with 05:12 USB devices before and you have that USB cable. If 05:12 that USB cable is 3.0 above, it's going to have 05:12 something like this.

05:12 So this is -- I'm showing you what's inside -- 05:12 the wires inside that USB cable that you use a lot in 05:12 your life.

05:12 So if we look at the wires inside that cable,

05:12 we're going to see here this set of wires. And this set of wires here, we have two -- see here, we have -- SS stands for super speed because this is the whole idea of USB 3 to provide super speed -- super speed on top of like USB 2, higher than USB 2.

05:12 And you see we have super speed TX, TX for the transmitter. And then we have another pair, SST -- another set of pairs for the receiver.

05:13 So here, it just -- I mixed things up.

05:13 So here, the -- we have one pair, right, for the -- this is the pair that I'm showing here in yellow. This pair is for the -- for the -- for the receiver on one -- for the transmitter on this side.

05:13 And we have another pair of wires for the -- for the receiver. And here, each one of these pair is a differential signal pair as we describe before.

05:13 Q. Do you know whether this is a low-voltage differential signal?

05:13 A. Yes. And I have, like, a slide about that.

05:13 Q. But before we get to that slide, the question I have is: We're looking at a diagram of a cable.

05:13 Would these same channels be found on the other side of a USB 3 port inside of the computer as well?

05:13 A. That's right. So any cable will have two

sides. So we have -- like, let's say this side -- does not matter which side, but we can -- this side eventually we're going to connect it to the USB port on the computer, right?

And the other side, this one will be connected to the device, USB device, like, could be like a camera, storage, whatever.

On this side now, when we -- for this side, when we connect this cable -- cable to that USB port, all these wires will have matching wires within that port, right?

Q. Perfect. Thank you.

Now, the question I didn't let you answer was whether these are low-voltage differential signal channels.

A. Yes.

Q. I believe you indicated that you have a slide on that?

A. Yes.

Q. Can you tell the jury what we're looking at on our screen?

A. And again, like, here it shows the -- this -- this value. It shows the differential, $V_{TX-DIFF-PP}$, which is the peak-to-peak value of the differential voltage, and shows that here we have two values, the minimum is

05:14 .8 and the maximum 1.2, right.

05:14 And just remind us, with PCI Express, right? PCI Express, the previous technology that we discussed, also has .8 to 1.2 normally.

05:15 Q. I think in that context you determined that was low voltage. Do I remember correctly?

05:15 A. That was low. Yeah.

05:15 Q. Is this similarly low voltage?

05:15 A. Yes. I'm not the only one that would determine it to be low, because the specification itself refers to it as low voltage.

05:15 Q. Very good.

05:15 Let's move on to that third claim limitation you want to introduce the jury to.

05:15 What is a central processing unit?

05:15 A. Yeah. So the central processing unit, like this one, basically the brain of the computer. It's the part of the computer that executes instructions.

05:15 You have programs. Those programs will execute it by the CPU. They could be add instruction, multiply, divide, whatever.

05:15 So -- and this CPU is generally inserted in the motherboard in this slot, for example. This is just an example. So here we put this CPU, and we insert it in this slot on the motherboard, right?

Q. Great.

What is an interface controller, and what are we looking at?

A. Okay. So remember the LVDS channels that we talk about that were disclosed, like, by the patents to convey USB -- to convey PCI Express data or USB data?

So here, we have these -- these are the LVDS channels that we have. And there we go. And the interface controllers, see, we have one interface controller here and we have one interface controller on this side.

The interface controller basically manages these LVDS channels. Everything needs to be somehow managed configured toward the way it's supposed to work. So the interface control basically manages these channels.

And to give an example to the jury, if -- if you can think about the CPU as the chef in the restaurant, then the interface controller will be the wait staff that will manage the orders and take food to the customers when the food is ready.

Q. Very good.

The next limitation you highlighted was graphics controller.

Can you introduce the jury to what that is?

A. Yeah. So I'm sure like if the -- some of the jury have kids, like their kids love gaming and all that and they care about the graphics cards. So the graphics cards can be like in this form. And in this case, it would be inserted in one of these PCI Express slots.

And it sometimes can come like this in the form of a GPU with some surrounding elements, and that one, in the case of laptop, it will be like that. It will be like this in the laptop. This one, like it will be like in the PC.

And in some cases, the GPU itself or the graphics system or the graphics controller can be integrated part of the CPU. So the CPU can act as both CPU and GPU at the same time.

Q. Great.

And the final of the six was a peripheral bridge?

Can you introduce the jury to this hardware?

A. Yes. According to the patents, the peripheral bridge is a unit that can allow more and more devices to be connected to the computer system or to the motherboard. And the peripheral bridge is basically the chipset that we have in the computers. It's most commonly referred to as a chipset, which is this unit.

05:18 Remember the CPU which is the main part of the computer, the brain of the computer. Sometimes we refer to this chipset as the companion chipset because it's meant to be a companion to the CPU.

05:18 And by this we can add additional ports, we can have, like, additional USB ports. We have additional PCI Express slots and so on.

05:18 Q. Thank you for that crash course.

05:18 Dr. Sarhan, is this, what you've just described to the jury, the understanding of the patent claim limitations you've applied in performing your infringement analysis?

05:18 A. Yes.

05:18 Q. And how specifically did you present that infringement analysis in this case to date?

05:18 A. So I wrote an expert witness report which is part of these exhibits. So like this -- it's 500-page report -- more than 500-page report on infringement.

05:19 And basically, I analyzed the patents and the claims and figured out whether the products, according to the specifications and how they work, et cetera, whether they meet the claim limitations in the -- in the patents.

05:19 Q. You mentioned 500-some-odd products had been accused of infringement.

How did you organize that for purposes of your infringement analysis?

A. Okay. So what I did is that I grouped these products into -- or I classified these products into groups. Right? And then, like, I examined one representative product in each group.

Q. How many groups did you have?

A. So I ended up with like -- yeah. We have 29 representative groups.

Q. Did you conclude that each of these 29 groups infringed the asserted claims?

A. No. Not the whole 29.

Q. Describe how many you left behind.

A. Okay. What I did -- yeah. When I did my analysis on the accused products and I classified them into 29 representative groups, 4 of the groups I didn't find adequate evidence for infringement, so I decided to remove them from my report. And then like the rest, 25, basically, I determined that they infringed ACQIS' products.

Q. And those 25 groups, are those the 500-odd products that you discussed earlier in your testimony?

A. Yes.

Q. Okay. And did you conclude that each of these products that remain in the case infringe the apparatus

claims we discussed earlier, the claims protecting a computer?

A. Yes.

Q. Did you conclude that each of the products that remain in the case were manufactured according to the method claims asserted in this case?

A. Yes.

Q. Does Slide 57 accurately summarize the infringement opinions you arrived at in this case?

A. Yes.

MR. HALES: Your Honor, we're going to do the infringement walk at this point. It's probably going to take about 45 to 50 minutes. I know it's going to put us about 6:05 or 6:10. I just will proceed however you think is wisest.

THE COURT: Ladies and gentlemen, I try and defer to you all. I'm happy to stay. We could stay till 5:45 and then break. We could break now. We can stay till 6:00. You let me know what you'd like to do.

You're okay? Want to go to 5:45? Will that work?

MR. HALES: I'll bet we could do one of the representative products by then.

THE COURT: Let's do that. But thank you

for asking.

MR. HALES: Yes. I certainly appreciate it.

BY MR. HALES:

Q. Dr. Sarhan, let's share with the jury how you arrived at your infringement conclusions. Let's start with the representative desktop, if we can.

A. Yes.

Q. What materials did you review to make your infringement determinations with respect to this -- the S340MF product?

A. Yeah. I reviewed the ASUS product specification. I reviewed the ASUS user manual. And also, I reviewed other technical documents produced by ASUS and third parties, in this case, Intel, for the processor.

Q. Will you take a look at P-17, please?

A. Say it again?

Q. P-17.

A. J-17, right?

Q. P-17.

A. Oh, P. I'm getting tired.

Q. Should be in Volume I, if I'm not mistaken.

A. Yeah. In Volume I, I have J-17.

Q. Let's open J-17 and tell me what you see.

A. Yeah. Okay. So this is the -- okay. So this is the -- basically the products, the ASUS product specification for this desktop.

Q. Okay. Is this the same specification sheet you relied on in arriving at your infringement opinions?

A. Yes.

Q. Great. My mistake. It is J-17.

And will you please open to P-344?

A. Yes.

Q. What is P-344?

A. It's the -- it's the data sheet for the 8th and 9th Generation Intel core processor. This is basically the data sheet from Intel for the -- this desktop. This desktop uses an Intel processor. And this data sheet gives us the details about this processor, how it's designed, the background, and all of that information.

Q. And have you relied on this document in forming your opinions?

A. Yes.

MR. HALES: Your Honor, we offer them into evidence.

MR. BURESH: Which ones?

MR. HALES: J-17 and P-344.

MR. BURESH: No objection.

THE COURT: Admitted.

BY MR. HALES:

Q. All right, Dr. Sarhan. Let's turn our attention to the first claim and perform an infringement analysis.

Have you concluded whether the S340MF has a printed circuit board?

A. Yes.

Q. Does it --

A. So yeah. Just I'm organizing all these folders.

Q. You know, I'm jumping into it. Let's just pause for one second.

Is this Claim 10 of the '768 patent?

A. Yes.

Q. And are we looking at the claim limitations of this Claim 10?

A. Yes.

Q. Okay. Let's walk through them just one row at a time and decide if you've concluded whether they are found in this accused product, all right?

Does this product have a printed circuit board?

A. Yes. As any computer, like it will have a

motherboard which contains -- which holds all the different components of the computer and connects them together.

Q. Okay. What about a central processing unit?

A. Yes. As any computer, like it will have a central processing unit.

And here, even if we look at the ASUS product specification -- this is the ASUS product specification -- it shows the information about the processor. It can have either this or that about the processor.

Q. Okay. Let's go to the third row.

Does this product have a peripheral bridge directly coupled to that CPU without an intervening PCI bus?

A. Yes. So we have this chipset. This is again from the ASUS product specification. And this specifies this chipset. That's connected directly to the central processing unit.

Q. So that was a long limitation.

What is the chipset from the language we see at the left?

A. The -- yeah. The chipset is basically the peripheral bridge.

Q. Okay. And what are we looking at here on

Slide 62?

A. Yeah. So here we see the -- this is now from the Intel CPU data sheet. So this is the details for the CPU that -- that used in this product. And you see here we have in this diagram -- in this diagram we have this part, which is the CPU itself. And this part is the peripheral bridge or the chipset or PCI chip.

Q. Okay. And in between them I see you've put a square around DMI.

What is DMI?

A. So DMI is an interconnect between the -- it's proprietary to Intel. Intel develop this interconnect to connect between the processor and the chipset.

Q. Is DMI a peripheral component interconnect bus?

A. No.

Q. Okay. Well, what is it based on?

A. DMI is based on PCI Express.

Q. Is PCI Express itself a PCI -- I'm sorry -- a peripheral component interconnect bus?

A. No.

Q. Okay. I've run out of language to investigate here.

Are the limitations of claim -- or Row 3 met in this product?

A. Yes.

Q. Okay. This is a lengthy limitation here in Row 4. Let's take it in constituent pieces.

Have you concluded whether this accused desktop product has a low voltage differential signal channel directly extending from the peripheral bridge that you've identified?

A. Yes. So here it says: LVDS comprising two unidirectional serial channels of multiple opposite directions, right? And this is -- must be used, like, to convey address and data bits of a PCI transaction.

And here, we see this -- like, this is the peripheral bridge again.

And directly extending from this peripheral bridge, we have this DMI. And we have this PCI here -- PCI Express channels. And these are -- as we discussed earlier, like, they employ LVDS in opposite directions and they are used to convey address and data bits of a PCI transaction.

Q. Okay. So we heard the earlier analysis about PCI Express, but DMI, what reason do you have to believe that it also would be a LVDS channel?

A. Yeah. I looked at a lot of documents from Intel, a lot of -- and these documents, they described how -- like, details about DMI, how it works.

And even, like, in one of the documents I looked at, it showed the differences between DMI and PCI Express. None of these differences would matter in terms of this analysis that I just performed.

Q. Great. Let's proceed further in this lengthy limitation.

Does this product have the LVDS channels we just discussed, which have two unidirectional serial channels of multiple differential line pairs to convey data in opposite directions?

A. Yes. And here, now we're going back to that ASUS product specification that tells us the features of this product.

And clearly here it shows that we have different PCI Express channels, including this channel, which has 16 lanes, right? And here, like -- yeah. And here, this one like -- and this one has one lane, and that one, here, is not specified.

Q. Okay. Are you confident that these channels will have signal pairs to convey data in opposite directions?

A. Yes. This is the nature of LVDS as we discussed before. So when talk about PCI Express, I don't want to, like, maybe, like, show it again in the slides, but we show that we have, like, differential

05:29 pairs in opposite directions.
05:29 Q. Great.
05:29 A. So we already established that.
05:29 Q. The language here at the end: Wherein, the LVDS channels convey address and data bits of a PCI bus transaction.
05:30 Is this limitation satisfied?
05:30 A. Yes. Because the whole idea of PCI Express is to convey address and data bits of PCI transaction.
05:30 Q. Very good.
05:30 And this last limitation, it appears new. Can you introduce the jury to a network controller?
05:30 A. The -- yes. So here, like, if we look again at the product specifications, we can see that here we have different network controllers, right?
05:30 And so here, we have WiFi. And here, we have RJ45 Gigabit Ethernet connector, which is, like, to connect it to a local network through a certain wire.
05:30 Q. Is this final limitation met in the accused desktop product?
05:30 A. Yes.
05:30 Q. Does the accused desktop product satisfy all limitations of Claim 10 of the '768 patent?
05:30 A. Yes.
05:30 Q. Very good.

Let's move on to Claim 13 of the '768 patent.
Is the accused desktop a computer, Dr. Sarhan?
A. Yes. Of course.
Q. Does it have an integrated central processing unit with an interface controller on the same chip?
A. Yes. And we said all of them have it, and we have that in the processor diagram, which shows that.
Q. On what basis do you conclude that it has an interface controller?
A. Yeah. So here -- yeah. So the -- this is the integrated CPU. This is the CPU. And if we look at this CPU, we see here we have some channels coming out of it, including the PCI Express channel and we have DMI channels.
So these are LVDS channels, as I described earlier, and these LVDS channels basically -- the -- yeah. Sorry -- needs to be managed, needs to be configured. So we must have interface controllers to manage these LVDS channels.
Q. Okay. Is this limitation met, Dr. Sarhan?
A. Yes.
Q. Let's go to Row 3. Again, it's another big limitation. I'd like you to focus your analysis here on anything that's new relative to the prior LVDS term we've analyzed.

A. Yes. So here like -- yeah. Go ahead.
Q. In the first half here, is there any important language the jury should focus on for purposes of your analysis?
A. So same as before, we have these, like, the PCI Express channels here, DMI. These are LVDS channels to -- that convey address and data bits of a PCI bus transaction.
Q. Okay. In the second half of the language, is there any important new concept that the jury should focus on?
A. Everything is same as before except here now we have "multiple," right? So this is the keyword here.
Q. Does --
A. This is the additional requirement.
Q. Does the accused desktop product use multiple lanes of the LVDS channels you've identified?
A. Yes. So here, like, we can see this one here, like, for the PCI Express, right? So it shows x 16.
Q. What does "x 16" mean?
A. 16 bits.
Q. Okay.
A. So it has 16 bits.
And also, the DMI here, although it does not

here show, like, how many lanes it has, DMI, like, by reading Intel documents, I determined that it has between four to eight lanes.

Q. Okay. This final limitation, what is system memory, and is it directly coupled to the CPU of this accused product?

A. Yes. So here we see the -- in the processor diagram, we have this main memory or system memory as we can see even in here. And it's connect -- and this is the CPU. And here, we have direct connections between the CPU and memory.

Q. And does this product actually use the diagram system memory found in the internal document?

A. Yes. Actually, if you look at the product specification, if you go back to the ASUS product specification, it tells us, yeah. This...

Q. I guess this specific product, does it employ the scheme that we see recommended by Intel on the product --

A. Yeah. In the next slide, we -- yeah. So here, it shows the specific memory that's actually used.

Q. Okay. Are all limitations of Claim 13 found in the accused desktop product?

A. Yes.

Q. Let's go to Claim 19 of the '359 patent.

Does this patent require any special handling, or does our discussion of the '768 patent suffice?

A. Yeah. I'd like to discuss -- whatever we discuss about '768 would be sufficient.

Q. Okay. I think we've established this is a computer, Dr. Sarhan?

A. Yes.

Q. Does it have a CPU connected to a first LVDS channel with the limitations that are recited there?

A. Yeah. So here, we have the CPU again. And you see here, we have these PCI Express and DMI channels, which are LVDS channels that, like, convey data in opposite directions.

Q. Does your prior discussion of system memory apply for this limitation too, Dr. Sarhan?

A. Yes. And if you look at this product, it tells us that it has this specific memory.

Q. Okay. Does this product have a connector that can couple to a console?

A. Yeah. It has actually a lot of connectors. You see here, like, it has these different USB connectors. It has Ethernet connector, HDMI, and so on.

Q. Now, the Court has construed the term

"console."
Have you applied the Court's construction of console in interpreting infringement of this limitation?
A. Yes.
Q. Okay. Do you have any reason to doubt that the connectors we view from the spec sheet here are capable of connecting to a console as that term has been defined?
A. Yes.
Q. I'm sorry. You do have reason to doubt or --
A. Sorry. Yeah.
Q. I'll re-ask the question.
A. Yeah.
Q. Do you -- having applied the Court's construction for console, do you have any reason to doubt the connectors we see here are capable of coupling to a console?
A. No.
Q. Okay. What about this second LVDS channel, what do you look to in the accused product for satisfaction of this limitation?
A. Yeah. So here it says that: A second LVDS channel, again, comprising two sets of unidirectional differential signal pairs in opposite directions.

05:35 And here, like we'll see in the next limitation, that calls for USB --

05:35 (Clarification by Reporter.)

05:35 A. The next limitation also -- it says that's going to send USB data.

05:35 If we go, like, to the previous slide, you can see -- like, you know, as we discussed before in the Universal Serial Bus Specification 3.0, like we showed this cable previously and we showed that it has -- it uses two LVDS channels in opposite directions.

05:36 Q. Okay. Is that limitation met, Dr. Sarhan?

05:36 A. Yes.

05:36 Q. And the final limitation is -- are those USB channels and ports capable of -- are they adapted to transmit data packets in accordance with the USB protocol?

05:36 A. Yes. The whole purpose of the USB protocol is to send and transmit USB data.

05:36 Q. Okay. Are all limitations of Claim 19 in this patent found in the accused desktop product?

05:36 A. Yes.

05:36 Q. Okay. I'd like to move on to the method claims.

05:36 Will you provide the jury a refresher? What are we looking for in a method claim?

05:36 A. Method claims, they specify the steps taken to manufacture a certain product, a physical product. So here, we're referring to manufacturing steps.

05:36 Q. How did you perform your infringement analysis for the method claims?

05:36 A. Still I use the -- like, the same documents I mention before. I looked at the -- I reviewed the ASUS product specification, user manual. I looked at third-party documents, including those by Intel.

05:37 Q. Any witness testimony, Dr. Sarhan?

05:37 A. Yes. I reviewed some deposition testimony by ASUS employees that spoke about, you know, like, how the ASUS products are designed and manufactured.

05:37 Q. Did you visit the manufacturing facilities?

05:37 A. No.

05:37 Q. Okay. Why not?

05:37 A. So I don't think it's necessary to visit the manufacturing facility.

05:37 Q. Okay. Let's go to Claim 36 of the '797 patent.

05:37 Is there anything that you want to slow down and describe that is particular, unique to the '797 patent, or was our discussion of the '768 sufficient?

05:37 A. Yeah. It should be sufficient.

05:37 Q. Very well.

Have you concluded that the limitation here in Row 1 is satisfied in the manufacture of this accused product?

A. Yes. So here, because it speaks about the method of improving data throughput on a motherboard, right? And later on, in the later limitation, we'll see, like, how it's going to actually improve the throughput.

Q. Okay. In any event, have you concluded this product has a motherboard?

A. Yes.

Q. Okay. Have you concluded whether a CPU has been mounted in it with an interface controller as a single chip?

A. Yes. As we see, the product will have a CPU, and the CPU will have interface controller as mentioned earlier because of these LVDS channels, and the CPU will be mounted on the motherboard because this is where the CPUs will be mounted.

Q. Has the manufacturer connected the low voltage differential signal with the properties recited there in Row 3?

A. Yes. As we see, we have these PCI Express and DMI channels, which, again, employ LVDS technology.

Q. Has the manufacturer increased data throughput

of these channels by providing them with multiple differential signal pairs?

A. Yes. So as I mention before, PCI Express here, x 16, which means it has 16 lanes. And DMI, as I mentioned, has between four to eight lanes.

Q. Okay. Has the manufacturer configured the interface controller to --

MR. HALES: I'm going to discuss an Intel document, Your Honor, and I have to seal the courtroom for about 30 seconds.

THE COURT: Okay. If you're not under the protective order, please exit the courtroom.

(Sealed proceedings.)

BY MR. HALES:

Q. Dr. Sarhan, has the manufacturer increased the throughput of the serial channels by providing them with -- oh. We've discussed that.

Have the -- has the interface controller of this product been configured to adapt to different numbers of differential signal line pairs for conveying encoded address and data bits?

I'd like for you in your answer, please, to focus specifically on the concept of adapting to different numbers of differential line pairs and encoding.

05:39 A. Okay. So the -- which limitation are we at at this point?

05:39 Q. The fifth limitation here -- the fifth row, rather.

05:39 A. Okay. So the -- I'm not sure if we talked about the previous one. Just like -- maybe like to be sure.

05:39 So it says that increasing the data throughput with multiple differential signal channels. When we have, like, multiple lanes, as we saw here, like x 16 means 16 lanes. The whole idea of having more lanes is to increase the data throughput.

05:40 Q. Okay. And how many lanes is DMI employed with?

05:40 A. Again, [redacted]

05:40 Q. Okay. Is this Row 4 of the limitations there satisfied?

05:40 A. Yes.

05:40 Q. Okay. This fifth row, I'd like for you to pay special attention in your analysis, if you can, to whether the interface controller is able -- capable of adapting to different numbers of line pairs and whether it's capable of encoding address and data bits --

05:40 A. Yes.

05:40 Q. -- in the manner recited there.

A. So again, like the interface controller charged with managing the LVDS channels, the -- according to the PCI Express specification, the -- the -- like the PCI Express will adapt whatever number of LVDS channels, whatever number of lanes that are actually supported by the peripheral device. Right?

So whatever, like, number of lanes that are supported by the peripheral device, the PCI Express system will adapt accordingly and will -- there'll be some negotiation and they will reach the minimum number that's actually supported by two -- the two parties, like the two units that communicate with each other.

And also, like in the PCI Express specification, it teaches that some lanes -- if some lanes may experience temporary or permanent failures, then the PCI Express standard calls for changing the number of lanes, like, dynamically to account for any temporary or permanent errors that may occur.

Q. And the analysis you just provided is relevant to what claim limitation here in Row 5?

A. Yeah. So here, like basically, the interface and control does adapt to the number of lanes that are available.

Q. Okay. Proceeding through that limitation, does PCI Express -- or I think you've identified DMI as

another LVDS channel.

Are they capable of encoding and conveying address and data bits of a PCI bus transaction in a serial form?

A. Yeah. So here, we have the -- and I did, like, a new keyword, encoded. Encoded has been -- this word has been construed by the Court. And basically, it will require like the address and data bits to be converted from parallel to serial form.

Q. Does PCI Express do that?

A. Yes. [redacted]

Q. Uh-huh.

A. [redacted]

[redacted]

Q. Thank you, Dr. Sarhan.

Are the limitations of Row 5 met in this --

05:43 the manufacture of this accused desktop product?
05:43 A. Yes.
05:43 Q. Dr. Sarhan, has the manufacturer coupled an integrated CPU and interface device in the manner recited in this final row?
05:43 A. Yeah. So here, it says that coupling the integrated CPU to a peripheral device attached to the motherboard through that LVDS channel. And we see here, we have --
05:43 (Clarification by Reporter.)
05:43 A. Okay. And here, we can see that the -- like the storage, it has storage that's connected through the PCI Express channels. And we have also additional expansions so that you can have additional devices.
05:43 BY MR. COLLARD:
05:43 Q. Thank you.
05:43 Are all limitations of Claim 36 performed in the manufacture of this accused desktop product?
05:43 A. Yes.
05:43 Q. All right. Let's move on, if you will, to Claims 20 and 21 of the '654 patent.
05:43 Is there any reason to discuss this patent individually at this point?
05:44 A. No.
05:44 Q. Okay. I'd like to take these claims together,

05:44 if I can, because of their interrelation.

05:44 THE COURT: Why don't you wrap up with these claims?

05:44 MR. HALES: Sure. I've just got one claim after that and then --

05:44 THE COURT: Thank you.

05:44 MR. HALES: -- the desktop is done. I'll go fast.

05:44 THE COURT: No, no, no. I don't want you to go fast. I just -- that's fine.

05:44 MR. HALES: Well, I'm going to do it anyway if you won't get mad at me.

BY MR. HALES:

05:44 Q. Dr. Sarhan, has the data communication speed of this computer been increased by following the steps that are recited below?

05:44 A. Yes. And we'll see that as we go through them.

05:44 Q. Has this product been provided with a CPU that has a graphics controller on the printed circuit board?

05:44 A. Yes. The CPU data sheet shows that it has -- that specific computer has integrated the graphics.

05:44 Q. And is that what you've highlighted here?

05:44 A. Yeah. So this is -- here, it shows the -- like for different product lines, it shows that all of

them have graphics configuration, which means that they include -- integrated the graphics.

Q. Thank you.

This third row, is there anything unique about this row relative to the prior discussion we had of LVDS channels?

A. No. So here, basically we have still like the CPU, and we have these LVDS channels coming out of it, as we discussed before.

Q. Okay. Has the manufacturer provided a connector for the computer to connect to a console?

A. Sure. And we see here in these connectors -- the USB connectors that we see here.

Q. Has the manufacturer provided a second LVDS channel that has been enabled to convey USB protocol data in the manner recited in these last two rows of Claim 20?

A. Yes. So here -- yeah.

So here, like we have the -- like basically the LVDS channel, like, we have a second LVDS channel to convey USB data. And this is met by the USB ports in these products.

Q. Are all limitations of Claim 20 met in the manufacture of this product?

A. Yes.

05:45 Q. Okay. Let's move on to Claim 21. This recites conveying encoded address and data bits of a PCI bus transaction and then more language.

05:46 I think we've discussed this encoded limitation. I think you pointed to PCI Express and DMI; is that right?

05:46 A. Yeah.

05:46 Q. Do you continue to do so for this claim limitation?

05:46 A. Yes.

05:46 Q. We see a conveying step here.

05:46 Do you have any opinion about whether an act of conveying the recited address and data bits occurs during the manufacture of this product?

05:46 A. Yes. So the -- like, basically, I looked at the deposition testimony of ASUS employees. Unfortunately, they did not give, like, specific answers and specific information about this.

05:46 But based on my own experience, like general experience, like all -- like most electronic products require testing. And I know like generally, computer products undergo testing while -- during manufacturing.

05:46 Q. Why are you talking about testing, Dr. Sarhan?

05:46 A. Say it again.

05:46 Q. Why are you talking about testing?

A. Yeah. Because like when they are tested, then like they will be running -- one of the ways that computers can be tested is by basically turning on the computer and running the operating system and the -- like -- which will do that enumeration, et cetera. And this enumeration step will result in conveyance of PCI data.

Q. So simply the act of turning on a computer that had been manufactured --

A. Yeah. By running the operating system. Yeah.

Q. Will that result in the limitation that we see here in Claim 21?

A. That's right.

Q. Okay. Do you know if this step is performed during the manufacture of this product?

A. I didn't go to the manufacturing facility, but I know, like, computers are very complicated products. They have so many different units, interconnecting units. They have hardware. They have software. A lot of things that can actually go wrong.

So this is why generally manufacturers test their products to make sure, like, you know, like, if they ship them to customers and they have problems, right, you know, then the customers would send them back. It will impact their reputation. And they know

ASUS and their website, and then -- like, they say that they test their products.

Q. Do you find it likely that this accused desktop product was turned on and tested during the course of its manufacture?

A. Yes.

Q. Okay. Are all limitations of Claims 20 and 21 met in the manufacture of this desktop product?

A. Yes.

Q. One more claim to go, Dr. Sarhan and our jury.

Before we jump into Claim 35, are there any limitations in this claim related to conveying PCI address and data bits or USB bits?

A. Okay. So here, like we -- like in previous (indiscernible) we can see sometimes it says LVDS channels used to convey USB data. Sometimes it's used to convey PCI address and data bits.

So here in this -- in these cases, we don't see any language like that. We don't see any PCI anywhere. So it does not -- does not require -- convey any PCI address or data bits.

Also, here, they don't even require conveying -- conveyance of any USB data.

Q. Great.

Let's jump in.

Dr. Sarhan, has the performance of this computer been improved by the manufacturing steps recited below?

A. Yes. And as we'll see when we discuss it.

Q. Does this product have a CPU with an integrated -- I'm sorry -- and a graphics controller on a single chip?

A. That's right, as we discussed before.

Q. We've seen similar LVDS language before.

Has this -- has the manufacturer connected an LVDS channel in the manner recited here?

A. Yes. So we have these two LVDS channels.

Q. Okay. Has the manufacturer connected a differential signal channel to the CPU and graphics controller to output video data? And if so, why?

A. Yeah. So here, differential signals channels, we see here we have DVI, HDMI. Like, I'm sure like most jury may be familiar with HDMI. DVI is an older one that's used, like, to -- both of them are used for videos, like, to connect that to the monitor.

And both of these employ differential signaling.

Q. Okay.

A. And then I say here, like, it says differential signal. It does not require, like, low

voltage or anything. But it just says differential signal, which is more general than low voltage.

Q. Thank you for that.

Has the manufacturer provided a connector for this computer to connect to external peripherals?

A. Yeah. And we see here all these connectors.

Q. Has the manufacturer provided a second LVDS channel that conveys in the manner recited here?

A. Yeah. We already talk about the first LVDS channel. Now here, like, as a second LVDS, those USB ports will qualify as requiring an -- another LVDS channel.

Q. Are all limitations of Claim 35 met in the manufacture of this product?

A. Yes.

Q. Are all of the asserted claims met -- I'm sorry.

Does this accused desktop product meet every limitation of every asserted claim in this case?

A. Yes.

Q. Okay.

MR. HALES: It's probably a good breaking point, Your Honor.

THE COURT: Very good.

Ladies and gentlemen of the jury, please

remember my instructions not to discuss the case when you go home.

If you all will be here by about by 8:15 tomorrow, we'll get started around 8:30.

THE BAILIFF: All rise.

(Jury exited the courtroom.)

THE COURT: Thank you. You may be seated.

Is there anything that we need to take up?

MR. HALES: No, Your Honor.

MR. BURESH: No, Your Honor.

THE COURT: Okay.

(Hearing adjourned.)

UNITED STATES DISTRICT COURT )
WESTERN DISTRICT OF TEXAS )

I, Kristie M. Davis, Official Court Reporter for the United States District Court, Western District of Texas, do certify that the foregoing is a correct transcript from the record of proceedings in the above-entitled matter.

I certify that the transcript fees and format comply with those prescribed by the Court and Judicial Conference of the United States.

Certified to by me this 7th day of April 2022.

*/s/ Kristie M. Davis*

KRISTIE M. DAVIS
Official Court Reporter
800 Franklin Avenue
Waco, Texas 76701
(254) 340-6114
kmdaviscsr@yahoo.com